A Chilton Publication

The Iron Age

THE NATIONAL METALWORKING WEEKLY • DECEMBER 9, 1954

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Aluminum parts are automatically conveyed through a series of abrasive belt and buffing stations on this Acme rotary unit.

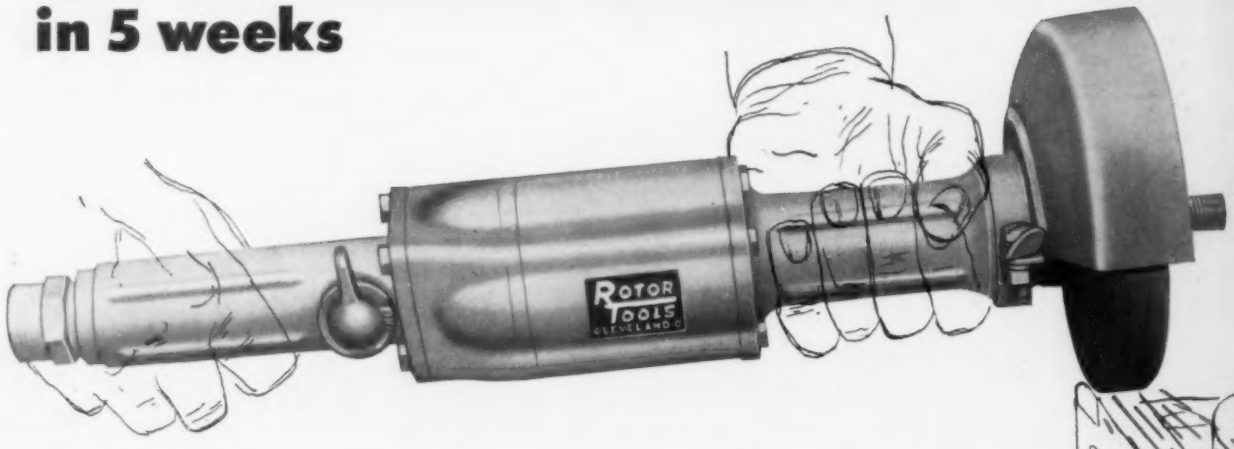
Polishing goes automatic with Behr-Manning coated abrasive belts

BEHR-MANNING®

SEE PAGES 32, 33

DOUBLES OUTPUT

New Rotor D-6 Air Grinder pays for itself in 5 weeks



JOB: Removing flash and parting lines from steel castings. Tool used 50% of production time.

FORMERLY: Used 6″ electric grinders at 3700 rpm. Required 10 minutes per casting.

NOW: Using New Rotor D-6 Air Grinders at 6000 rpm. Job time cut to 5 minutes.

RESULTS: Output doubled. Savings paid for new Rotor Grinder in 5 weeks. Wheels last longer. Tool is 5 lbs. lighter, easier to handle.

A demonstration on *your* work will show how *you* can improve production with these new Rotor Grinders. Ask for proof.

SPECIFICATIONS FOR ROTOR D-6				
RPM	WHEEL SIZE		LENGTH†	WEIGHT*
	Elastic	*Vitrified*		
6000	6″	4″	22¼	9¼
4500	8″	5″	22¼	9¼
4100	8″	5″	22¼	9¼

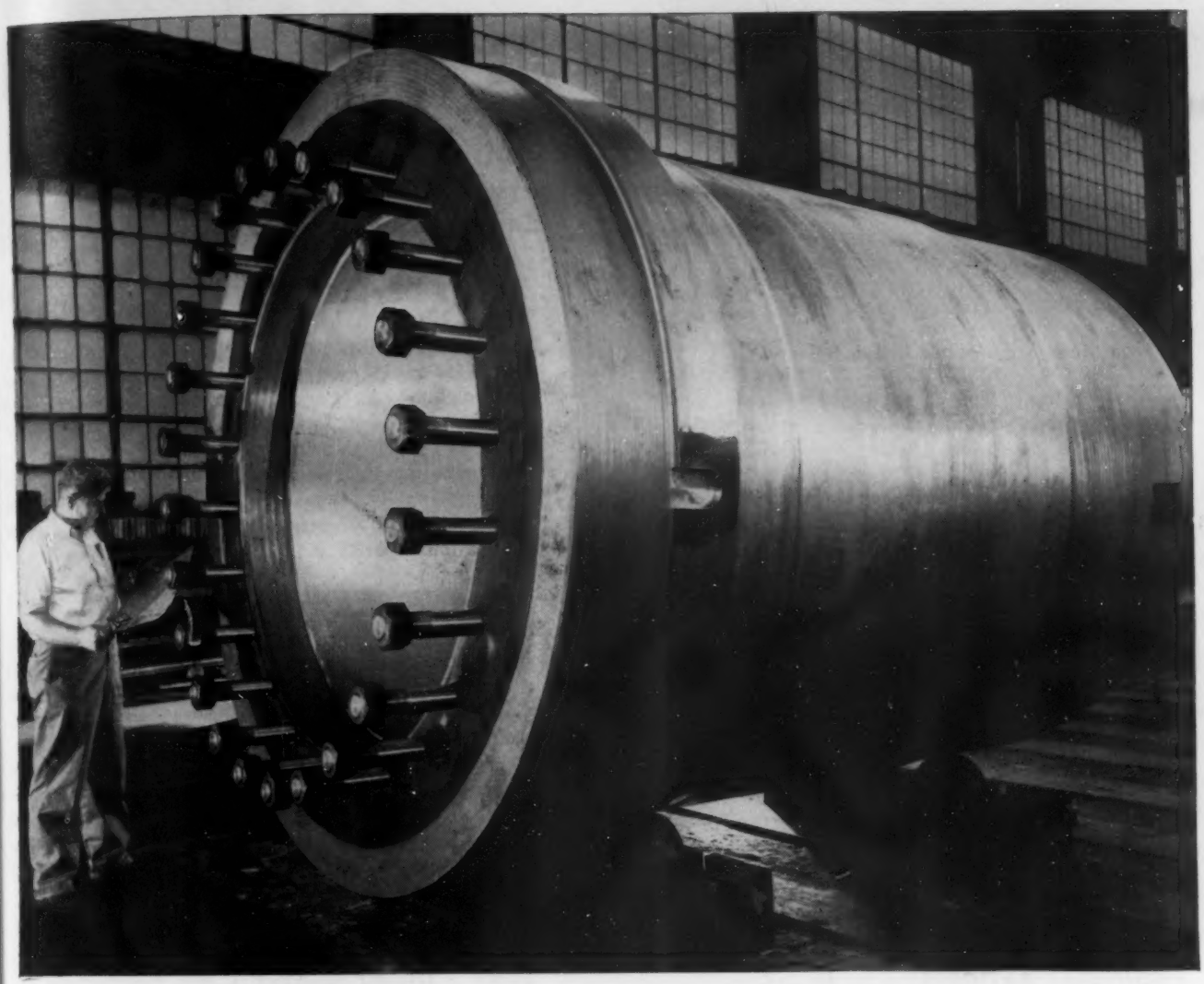
* For D-6S straight handle. Add ¾ lb. for D-6G grip handle.
† Deduct 1½″ for grip handle.

After 5 weeks, it's pure savings!

ASK FOR BULLETIN 44

THE ROTOR TOOL CO.
CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



76 Tons of Steel Cylinder

This big forging, shaped a good deal like an oversized kettledrum, is actually a steel cylinder for a 14,000-ton extrusion press. While by no means the heaviest forging Bethlehem has made, it is a very sturdy specimen. Also, it happens to have the largest diameter of any forged cylinder we have ever produced.

As shipped, the forging weighed just under 76 tons. It had an overall length of 14 ft, 3¼ in. and a maximum flange diameter of almost 9 ft. The bore at the large end of this cylinder was approximately 71 in.

This was an interesting job, the more so because it required some expert machining. That point about machining deserves special mention, for Bethlehem is equipped to machine any forging to customer specifications. Naturally, an order can be shipped as-forged if desired, but most customers rely on us for much of the machining work.

Your own plans may require forgings larger than the one shown here, or a great deal smaller. In either case, we'll welcome a call from you. Bethlehem makes forgings of every size and type, and it might surprise you to know how big—and how *little*—some of them run. Check with our people the next time you're in the market for forgings of any size.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM FORGINGS

BETHLEHEM STEEL

the Iron Age

Vol. 174, No. 24, December 9, 1954

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NEWS DEVELOPMENTS

VACUUM MELTING ABOUT TO BLOW LID OFF — P. 93
Look for rapid expansion in vacuum melting during the coming year. Current 25-ton-per-week capacity is triple last year's. And still more firms are coming into the field. With principal applications in jet aircraft and wide temperature range uses, technology is advancing rapidly. Ingot size now ranges from 600 to about 2500 lb but authorities now foresee furnaces of 2 to 5-ton capacity within the next 4 or 5 years. List advantages.

HOW TO HOLD DOWN FOUNDRY COSTS — P. 95
Few foundries have the same cost accounting system. Some don't really have any and that's why they sometimes find there's no profit in the job they're doing. Gray Iron Founders Society has set up a system designed to enable foundrymen to find out what their costs are. Main areas in which costs can be more closely analyzed and controlled are the melt shop, molding shop, core shop and in cleaning and shipping.

CHECK YOUR ADVERTISING EFFECTIVENESS — P. 96
Here's a 15-point checklist to help you increase effectiveness of your advertising. It applies to all industrial levels—anybody who sells anything.

CYRUS EATON TO GET FOLLANSBEE MILL — P. 97
New buyer of the Follansbee Steel plant is Cleveland financier Cyrus Eaton who has agreed to operate the facilities in Follansbee, W. Va., for at least 3 years. Republic Steel facilitated the switch by releasing Richmond from obligation. Richmond still holds Federal Enameling and three steel warehouses. Sale expected to stand.

AUTOMAKERS' PLATING RESEARCH PAYS OFF—P. 120
Detroit has learned how to make better brightwork and the stylists are obviously taking good advantage of it. Indication of the accent is that four GM divisions have brand new plating setups—and each claims the best.

TEST COMING ON SOUTHEAST ASIA BUILDUP—P. 125
President's program to help build up economy of Southeast Asia will be presented to Congress in January. If plan is successful it is expected to mean greater investment in Asia by private U. S. corporations. West Europe will be asked to help.

DIGEST OF THE WEEK

ENGINEERING & PRODUCTION

DIRECT CHILL CONTINUOUS CASTING OF MG—P. 149
Continuous casting of magnesium rounds and rolling ingots by the direct chill process has proved highly successful. Molds and cast are cooled by water sprays. Metal temperature, speed of withdrawal, volume and temperature of cooling water, and air pressure to pumps are continually charted for close control.

SHOT PEENING IMPROVES AIRCRAFT PARTS — P. 152
Many low volume aircraft parts are now being shot-peened to improve fatigue life and save weight. These include springs, landing gear trunnions, gears. Method is also used to form or straighten parts.

HOW TO CONTROL HYDROGEN EMBRITTLEMENT—P. 154
Improved control of hardness and protection from corrosion can help reduce or eliminate premature cracking failures resulting from hydrogen embrittlement in 12 chromium steels. Materials tempered in the 1000°F range show less susceptibility than those tempered in the lower range. Organic protective coatings help by preventing corrosion, leaving no hydrogen available to diffuse into the metal. The harder the material the more susceptible it is to hydrogen embrittlement.

SILICON CARBIDE BRICK CUTS MAINTENANCE—P. 160
Dust collected from ore sintering machines contains abrasive material which causes considerable wear on dust collector walls or linings. Use of silicon carbide brick linings has eliminated this maintenance problem in one plant. Bricks have lasted 7 years and are still in excellent condition.

TAG SYSTEM PREVENTS MATERIAL MIXUPS — P. 162
The "mixed metals" problem is a serious one in many plants. A system of colored tags keeps all materials and parts continuously separated and positively identified. Tags ride the production line from start to final packaging, saving time, money and customer rejects.

MARKETS & PRICES

HOT METAL SLOWS SCRAP PRICE INCREASE — P. 101
Re-lit blast furnaces are proving a prime consumer weapon in preventing a scrap price runaway. The opposite is happening despite the rising operating rate of the steel industry—The Iron Age scrap steel composite price has dropped from a peak of $34 to just over $32. But victory may be temporary. Scrap's strong factors are: exports, possible severe winter, lower stocks, good steel business, and rising electric furnace rate.

STEEL BUYERS CONTINUE TO FIRM MARKET — P. 203
The steel market continues to show more solid strength down the line of finished products. Leading the gains are auto buyers, but appliance people, stampers and miscellaneous manufacturers are jumping on the buying bandwagon. Oil country goods are undergoing a belated correction, although heavy buying is expected to be resumed during the first quarter.

UPTREND CONTINUES FOR MOST PRODUCTS — P. 204
Only a few regular seasonal downtrends run counter to climbing market. Cold-rolled sheets move into the second quarter in some centers. Strengthening of carbon bars is spreading into several market areas.

PRESS SALES UPTURN GAINING POWER — P. 105
Mild September rise in press equipment buying has picked up considerable steam. Some producers will boost their output 15 pct by first quarter. And backlogs are rising. Old customers are still best as glamor wears off new markets.

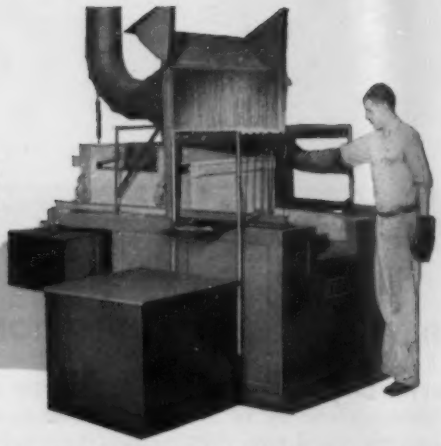
BRASS MILLS ADVANCE BASE PRICES — P. 210
A boost of about ½¢ per lb was put into effect last week on most brass mill products. Outstanding exception was free-cutting rod which was cut 1¢, probably to combat imported material. Extras are up 5 to 10 pct. Scrap buying prices higher.

NEXT WEEK:

HOW SURFACE TREATMENTS BROADEN ALUMINUM USES
Methods of surface treating aluminum, either for decorative purposes or for greater protection, have considerably broadened the uses for aluminum. Methods range from polishing to electrolytic treatments. Corrosion and abrasion resistance can be improved and surface can be prepared for good paint adherence.

WISE TRAFFIC MANAGEMENT SAVES FREIGHT COSTS
Manufacturers can save as much as 15 pct of freight costs by combining small pickups or deliveries to take advantage of truckload rates. Three extra stops are allowed. Savings can raise profit margin; they can also help firms to penetrate new markets. Case history shows step-by-step procedure.

FASTER, LOWER COST Hardening FOR ALL Engineering Steels



No Scale...No Decarb

Full hardness with no decarburization (even under microscopic examination) of silicon-manganese steel gears is obtained by a machine tool producer in this Ajax salt bath installation.

No other device approaches Ajax neutral salt bath efficiency in hardening steels . . . low carbon, high alloy, stainless, high-carbon high-chrome, high speed types . . . *because only Ajax protects the work so effectively from atmospheric effects.*

All air is "sealed out." A film of salt protects the work up to the instant of quenching . . . keeps the surface clean. Scaling, pitting, carburizing and decarburization are avoided.

LOW COST — First cost of equipment is only ½ to ⅓ that of any other production hardening system!

RAPID HEATING—Heating cycles from 4 to 6 times faster than in radiant type furnaces assure greater production in less time. Distortion is negligible.

UNIFORM RESULTS—*Uniform* physical properties result from *uniform* bath temperatures . . . and, in the Ajax furnace, a temperature variation of less than 5°F is held throughout. Smaller equipment in less space produces a given output. Unskilled labor can handle the entire process.

ADAPTABILITY—Selective heating is easily obtained by immersing only that portion of the work to be hardened. A unique method for hardening gear or sprocket teeth is to spin them in salt, immersing only the teeth.

WRITE FOR Ajax Catalog 116B, also list of documented case histories of hardening installations.

SEND your specimen parts to the Ajax Metallurgical Service Laboratory for treatment. No cost or obligation.

Fast COMPLETELY MECHANIZED HARDENING

4-pound spline shafts loaded 4 shafts to a fixture, and up to 10 fixture loads at a time, are hardened at 1550°F. in a mechanized Ajax salt bath furnace. They are automatically quenched in water followed by a nitrate salt draw at 600°F. The Ajax furnace has operated day in and day out 24 hours a day for over a year without interruption.

5400 BLADES A Day

Good carving knives need exceptionally hard, tough cutting edges . . . and these blades of 440 stainless steel have them! 150 lbs. of work per hour, or 5400 blades per day, are handled in a single Ajax salt bath furnace by one unskilled operator.

MORE WORK IN Less Space

Aircraft landing gears of SAE-4340 steel up to 62" long are hardened in Ajax salt bath furnaces by immersing them vertically in baths 75" deep. Over 800 pounds of work are processed per hour . . . Great space savings afforded by treating pieces vertically. Austenitizing furnace, requires less than 70 square feet of space.

No Rejects

On a run of 30,000 rock bits hardened with Ajax salt bath furnaces, not one was rejected. Bit life was increased 4 to 5 times by comparison with a previous hardening method. Plain carbon steel rather than costly alloy steel is used . . . 480 lbs. an hour are treated in a bath with working dimensions of only 36" x 11" x 36"! Hardness never varies more than 1 point from Rc52.

Trademark.

AJAX electric SALT BATH furnaces

HULTGREN

World's largest manufacturer of electric heat-treating furnaces exclusively

AJAX ELECTRIC COMPANY 904 Frankford Ave., Philadelphia 23, Pa.

Associate companies: Ajax Electric Furnace Corp.; Ajax Engineering Corp.; Ajax Electrothermic Corp
In Canada: Canadian General Electric Co. Ltd., Toronto, Ont.

dear editor: *letters from readers*

Lauds Article

Sir:

Congratulations on the very fine article written by E. C. Beaudet, Technical Editor, concerning Atlas' new mill in Canada, which appeared in the Nov. 4 issue of IRON AGE. *G. A. Roberts, Vice-President, Technology, Vanadium-Alloys Steel Co., Latrobe, Pa.*

Electrolytic Deburring

Sir:

We are very interested in your article on electrolytic deburring as it appeared in your Oct. 28 issue, p. 94.

We would like to obtain more information on this method if it is possible. Could you refer us to the people that are doing the experimental work or are providing the equipment? *M. P. Laursen, Chief Industrial Engineer, Marchant Calculators, Inc., Oakland, Calif.*

Further information on this subject may be obtained from the International Business Machines Corp., Manufacturing Research Dept., Endicott, N. Y.—Ed.

Overseas Markets

Sir:

In your Sept. 30 issue, p. 46, you published a cartoon with the caption "You and your new expanding overseas markets!"

This department is thinking of sending out a Christmas card overseas and we would like to have your permission to copy this cartoon for use on the card. Your approval would be very much appreciated. *M. P. Tuteur, General Manager, International Sales Div., Peerless Electric Inc., New York.*

Furnace Heating

Sir:

In your issue of Nov. 4, under Newsfront, we read the following note: Electric heating elements made of silicon carbide and designed for high temperature furnace use have been developed by a British company. The heating element is a silicon carbide tube in which the hot zone is a spiral. Temperature range is between 1472° and 2867°F.

We would be grateful if you would send us the name of the British company. *Gunnar Schjelderup, President, Christiania Spigerverk, Oslo, Norway.*

The company which developed the high temperature electric heating element is Morgan Crucible Co., Ltd., Battersea Works, London S.W. 11, England.—Ed.

Automation

Sir:

It would be greatly appreciated if I could be furnished with 15 copies of "Automation: Today's Challenge to Process Engineers" as printed in THE IRON AGE of Oct. 21. We plan to use this article as part of a new training program being offered at this plant. *R. J. Holmes, Inspection Supervisor, Knolls Atomic Power Laboratory, General Electric Co., Schenectady.*

Standard Cost System

Sir:

We have noted with interest the article by W. C. Fitts which appeared in the Sept. 9 issue entitled "Standard Cost System Pinpoints Excessive Cost Areas, Lowers Operating Expenses."

We would be most interested in obtaining five tear sheets of this article. *M. R. Minnick, General Manager of Sales, The American Welding & Mfg. Co., Warren, Ohio.*

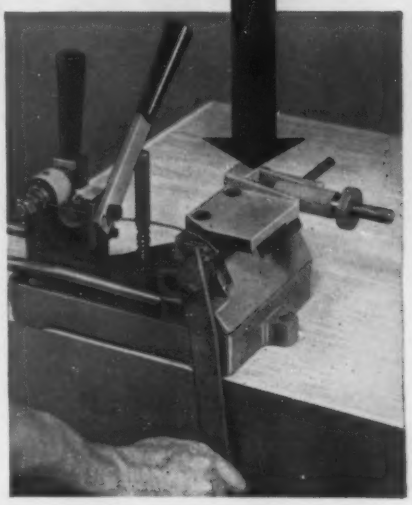
Modern Steel Plant

Sir:

On p. 113 of the Nov. 4 issue begins an article "Modern Steel Plant Teams Continuous Casting with Planetary Mill."

Would you send us six tear sheets of this article? *Horace Drever, President, Drever Co., Philadelphia.*

make Springs in Seconds!



Save Costly Special Orders With the NEW

DI-ACRO* Spring Winder

This unique machine eliminates costly special spring orders, saves valuable waiting time. Winds flat, torsion, compression and extension springs to 1½" O.D. Handles round, flat and rectangular wire to ⅛" dimension. Note exclusive features in the hand operated Di-Acro Spring Winder which assure accurate tension and fast operation without special experience or skill.

new **TENSION CONTROL**—Simply adjust to desired tension—the control keeps it uniform, for winding one spring or hundreds, and releases when each spring is wound.

new **WIRE CUT-OFF**—After spring is wound, release tension and use cut-off lever to quickly cut end of spring to desired length.

new **CAM LOCK**—Simply feed wire under cam, turn handle and wire is securely locked to arbor while spring is wound. No threading required.

FREE ENGINEERING SERVICE

Extension Compression Right Hand Left Hand Torsion

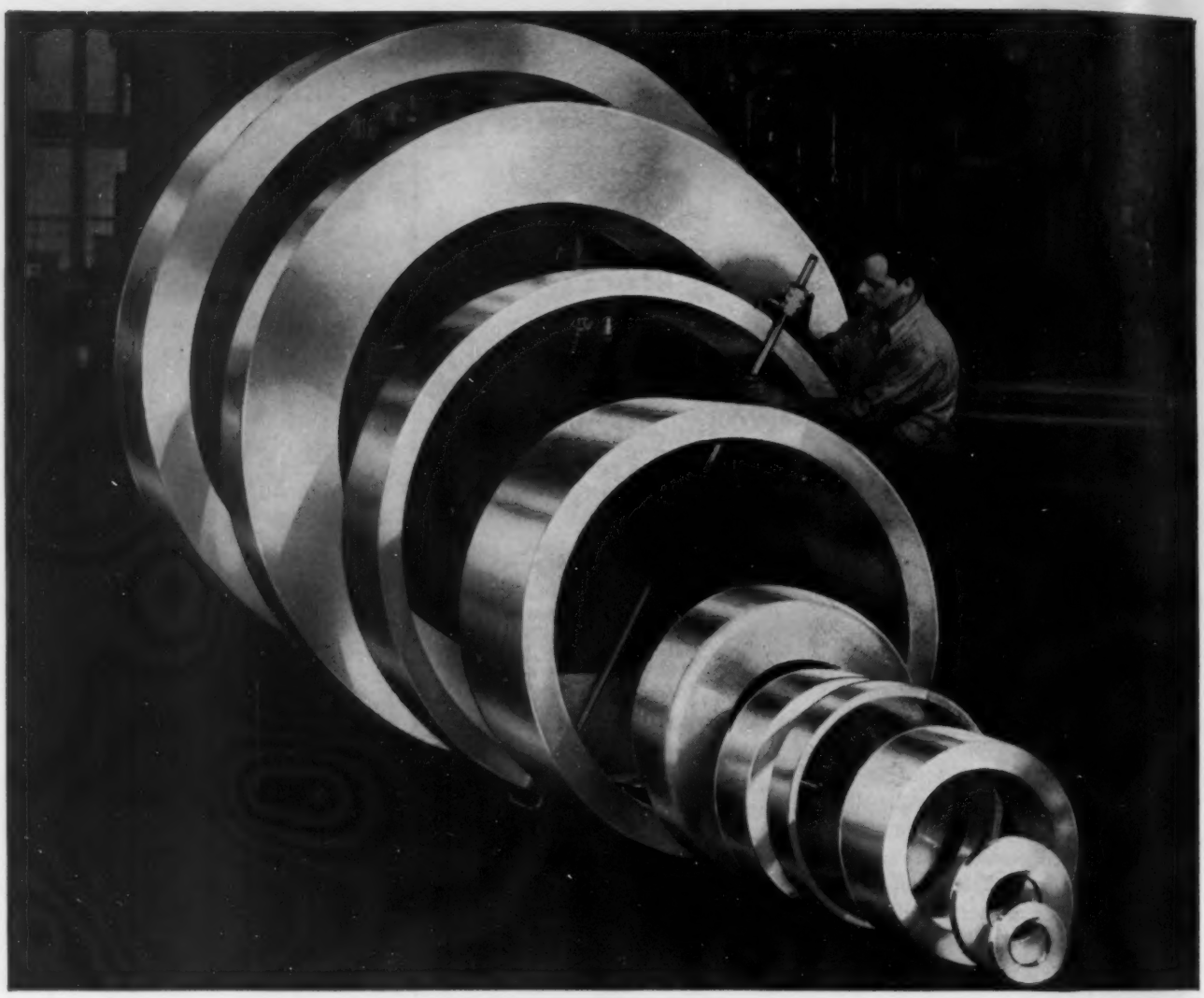
Send us your spring forming problems — samples or dimension sketches—together with sufficient test material, and let us wind some sample springs for you free of charge. No obligation.

32-Page Catalog gives complete details on all Di-Acro Precision Machines—Spring Winders, Benders, Brakes, Shears, Press Brakes, Punch Presses, Notchers, Rod Parters, Rollers.

*pronounced Die-ack-ro

O'NEIL-IRWIN MFG. CO.
302 8th Ave.
Lake City, Minn.

di-acro PRECISION METALWORKING MACHINES



A *Ring* OF *Extra Service* IN EVERY ONE

Rings for turbine reduction gears . . . thrust rings for bearing raceways . . . die rings for mills . . . Midvale craftsmen make them all. From the smallest ones of a few inches in diameter to one hundred eighty-five inches, from twenty pounds to twenty thousand pounds they are quality-controlled in every step.

Each Midvale ring is exact in metallurgical specifications because of the experienced steel making practices and complete open hearth and electric furnace facilities of Midvale. Rings are carefully shaped by craftsmen with years of forging and rolling skill. Heat treated in temperature controlled furnaces to assure wearing qualities that will withstand the severest friction, abrasive, crushing and grinding action.

This is why Midvale rings are noted for their long life . . . why gear makers order Midvale blanks . . . why Midvale rings and roll shells are used on the toughest installations. The men of Midvale working with the right equipment and facilities offer you a source of rings, rolls and forgings unsurpassed in quality and extra performance.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

fatigue cracks

by William M. Coffey

Reader Tips

We have received the very sad news that a loyal reader, Mr. J. Porklesmith Smythe III, has been quietly taken away. This leaves us with only 22 loyal readers of Fatigue Cracks. Where to find a replacement? We thought, perhaps, that a new department would stir up a new, loyal reader. So we herewith start a new department. It is called Reader Tips Department. It is a wonderful department. Our first reader tips come from the Ford Motor Company:

Keeping a bag of sand in the car trunk for sprinkling under the rear wheels for traction may mean the difference between a freezing night in a roadside ditch and one's own fireside. We rate this tip 67.88.

A couple of cardboards will come in handy for motorists who park cars in the open. The cardboards, if tucked under the windshield wipers, will insure clear glass against freezing rain and snow. We rate this tip 80.74.

An old windshield wiper blade kept in the glove compartment also is useful on the rare occasion when cold weather moisture is heavy and causes fogging on the inside of the car. The blade will keep the glass clear longer than if the driver uses the palm of his hand. We rate this tip 50.45.

A good trick to thaw a frozen door lock is to hold a lighted match or the flame of a cigarette lighter to the car key and then insert the heated key into the lock. We rate this tip 43.97.

Order your wife out of bed one hour early so she can back the car out of the garage and start the motor and heater. This will insure a comfortable, heated car when you finally start the drive to work. We rate this tip 100.00.

Letters

We always get into trouble when we try to improve on an editorial story. In the Nov. 25 issue we quoted IRON AGE'S weekly "Report to Management" page as predicting an all-time record baby crop. All by ourselves we added that, of course, this would be accompanied by a proportionate number of marriages, of course.

The Council of Economic Advisers, Executive Office of THE PRESIDENT, Mr. Robinson Newcomb enlightens us:

Dear Mr. Coffey:

Your page almost always illuminates one or more obscure problems for me . . . (*starts off real nice*) . . . I thought you had again illuminated a perplexing problem.

The number of births has been astounding experts, but I thought maybe you had explained the "record baby crop." However, when I compared the figures on births with those on marriages I failed to find a "proportionate number of marriages." After allowing for a discreet interval, it appears that there were roughly 2.2 births in 1946 for every marriage in 1945; that there were 2.6 births in 1953 and 1954 for every marriage in 1952 and 1953. We suggest that 5 out of every 10 couples married in 1952 and 1953 had twins; 4 had triplets; and 1 had quadruplets. If there is to be a direct relationship between marriages and births, 10 marriages of this fertility rate would give 26 children, or 2.6 per marriage. It does throw new light on the subject.

Very truly yours,

Mr. Newcomb, this is *exactly* what we had in mind!

Puzzlers

A fox is pursued by a greyhound and has a start of 60 of her own leaps. The fox makes three leaps while the greyhound makes two; but the latter in three leaps goes as far as the former in seven. How many leaps does each make before the greyhound catches the fox?

A bundlefull of mercies (*french*) to Mr. Benny Cyboron, Gates Rubber Company, Denver.

Do a Better Job Faster

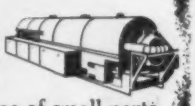
cut cleaning costs right down the line

METALWASH PARTS WASHERS, designed for *alkaline-, neutral emulsion-,* or *solvent-type cleaners,* are manufactured in five basic types, with *any cycle,* and in *any size* required.

FOR LIMITED FLOOR SPACE the *roto-table spray washer* handles individual parts or loaded baskets on a steel mesh conveyor travelling in a circle.

FOR CONTINUOUS LINE OPERATION soiled parts are loaded directly on a mesh belt conveyor which carries them through wash, rinse, and dry chambers to the unloading station

FOR CONTINUOUS MASS CLEANING the *rotary drum machine* tumbles a huge volume of small parts through the cleaning cycle by means of an internal helix.



FOR RACKED PARTS the *overhead monorail conveyor* washer is built around your existing plant conveyor, eliminating handling and re-racking.

FOR PRECISION PARTS CLEANING the vertical and horizontal return washers process delicate parts, eliminating possibility of scratching or rubbing.

METALWASH VAPOR DEGREASERS *provide new speed, economy, durability.*

METALWASH SPRAY PICKLING MACHINE is a *production method* in preparation for *enameling, plating, phosphating;* in removal of annealing scale after heat treatment.

METALWASH PHOSPHATIZING MACHINES *provide ideal surface for lasting paint finishes.*

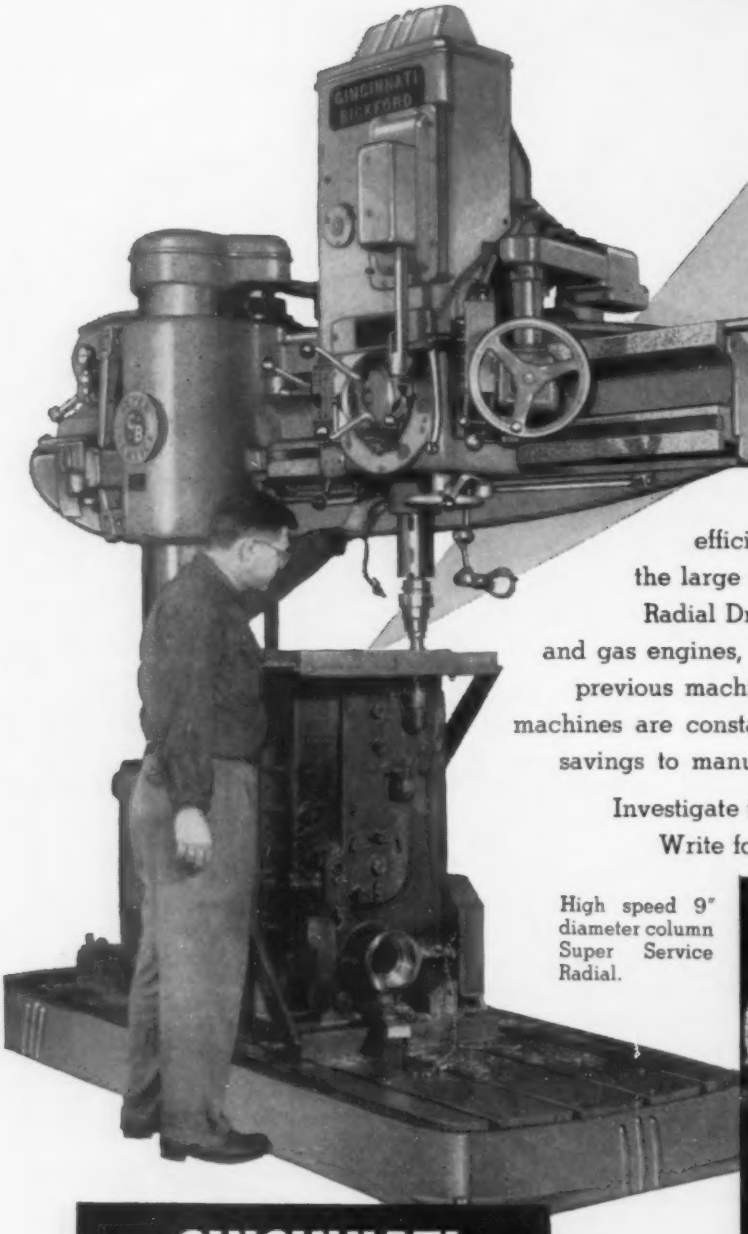
METALWASH®

WASHING PICKLING DRYING PHOSPHATIZING DEGREASING

METALWASH MACHINERY CORPORATION
920 North Avenue, Elizabeth 4, N. J.
In Canada, Canefco, Ltd., Toronto, Ontario

"We find Cincinnati Bickford drilling machines ...very satisfactory!"

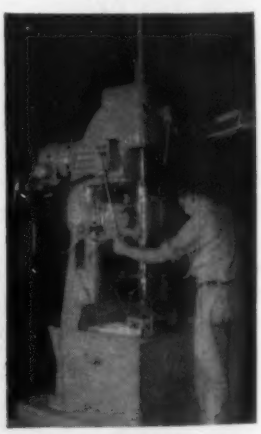
WHITE-ROTH MACHINE CORP.
LORAIN, OHIO



This shop is equipped with Cincinnati Bickford drilling machines. Their performance is efficient and profitable. For example, the large Cincinnati Bickford Super Service Radial Drill, drilling cast steel gear cases for diesel and gas engines, effected an 18% saving over previous machines used. Bickford drilling machines are constantly bringing savings to manufacturers.

Investigate these modern tools. Write for Bulletins.

High speed 9" diameter column Super Service Radial.



All geared 28" Super Service Upright Drill.

Photos courtesy White-Roth Machine Corporation, Lorain, Ohio.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.
Cincinnati 9, Ohio, U.S.A.

Lid About to Come off Vacuum Melting

Rapid expansion of vacuum melting expected during the next year . . . New firms will enter the field . . . Furnace capacities may be upped to 5 tons in next 4-5 years . . . Technology gains—By J. B. Delaney.

♦ VACUUM MELTING is about to emerge from its strait-jacket of limited productive capacity. Rapid expansion is looked for during the next year.

This and other aspects of vacuum melting were aired in formal meetings and corridor discussions at the twelfth AIME Electric Furnace Steel Conference in Pittsburgh. More than 800 metallurgists and engineers attended the four-day meeting.

Here is a summary of developments in the fast growing vacuum melting industry:

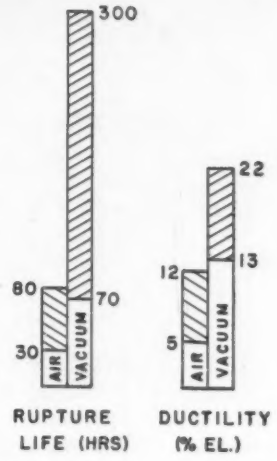
• **Present operating capacity** of approximately 25 tons per week represents a three-fold increase over 1953. This does not include furnaces on order but not operating. Vacuum Metals Corp., for example, is building a furnace of over 1-ton capacity expected to be in operation by mid-1955. Other companies are known to be about ready to enter the field. Current producers beside Vacuum Metals include Universal-Cyclops, Utica Drop Forge, and Carboloy Div. of General Electric Co.

Increased furnace size will enable the industry to broaden its potential field of application. Present ingot size now ranges from 300 to 1000 lb, a definite obstacle to potential application as aircraft landing gear components and in chemical and other fields. Vacuum Metals, with its new and existing furnaces, will produce ingots ranging from 600 lb to 2200-2500 lb. Some authorities foresee furnaces of 2 to 5 ton capacity possibly within the next 4 to 5 years.

• **Considerable progress** has been made in the technology of producing high alloy, high temperature nickel-base materials such as M 252 and Waspaloy; an impressive amount of data on production and application has been amassed. Some work is being done on the iron-base alloys but this has not yet reached the production stage.

• **Immediate problems** include that of increasing efficiency of induction melting in a vacuum in relation to efficiency of air melting, and persuading industry to adopt vacuum-melted materials on production runs. Chief stumbling blocks are cost as compared with ordinary alloys, and limited capacity. These objections are gradually being overcome.

Compare Properties



ADVANTAGE of vacuum melted nickel base precipitation hardened alloy shows clearly in comparison.

• **Principal Applications** to date have been in the form of aircraft engine bearings and buckets, instrument bearings and high speed heavily-loaded machine bearings. Potential applications include engine valves and valve springs, rolls and dies, cathode alloys in electronics, and high quality tool steel items. The industry has been testing a large number of alloys in a broad cross-section of industrial applications.

• **Price premium** for vacuum-melted alloys as compared with the air-melted product varies with the type of material. Premium for an alloy such as M 252 is relatively small at present and could be wiped out entirely. For a tool steel analysis the price might be double that of an ordinary product. The ratio on low alloy steels might be 10 to 1.

Working in favor of the vacuum metal producers is the high yield of their product. An example cited at the meeting was an average of 63 pct yield from ingot to bar on 60 M 252 heats. This compares with 40-50 pct on air melted product not including heats that are scrapped completely.

In one of four papers delivered on the subject, J. H. Moore, of Vacuum Metals, cited examples of improved rupture life, greater ductility, and better fatigue resistance through vacuum melting.

"The improvements being achieved by vacuum melting," he said, "appear to fall into three basic categories: (1) those which are the result of increased free-

SPECIAL REPORT

dom from inclusions, (2) those achieved by the elimination of gaseous or gas-metal compound precipitation, and (3) those resulting from better composition control."

Although poor from the standpoint of thermal cracking, magnesia furnace linings are the most satisfactory in minimizing contamination of the melt, Moore said. He added that while other linings may be better than magnesia, higher cost prohibits their use.

For High Pressure Use

E. M. Mahla of du Pont spoke of the chemical industry's interest in vacuum metals, particularly their potential advantages for high pressure equipment, in applications where superior surface finish is required, and where corrosion resistance is important.

R. K. McKechnie, General Electric Co., discussed his company's experience with vacuum melting. H. H. Scholefield, of The Telegraph Construction & Maintenance Co., London, Eng., reviewed European vacuum melting history and practice.

Titanium:

Build plant for new powder producing process.

Within 3 months the first production unit of a new commercial titanium powder plant is scheduled to begin operating. A new company, not yet named, is being formed to operate the $250,000 facility.

Initial capacity will be about 5000 lb per month about the end of February and two more equal-sized units coming in at 30-day intervals will swell the total to 15,000 lb monthly. Process to be used was developed by United International Research as a sideline in research toward an electrolytic titanium reduction method (THE IRON AGE, July 9, 1953, p. 73). Technical grade titanium dioxide is reduced by electrochemical and chemical means.

No Scrap Problem

Properties of the product make it useful for certain applications but not for others. Purity is 99.25 pct plus but the oxygen content of 0.2 to 0.4 pct results in a rather hard (as high as 350 Brinell) metal with accompanying decrease in ductility, impact resistance and fatigue strength. Hardness imparted by the oxygen gives the material good erosion resistance.

Initial powder price is expected to be set at from $10 to $18 per lb, depending on particle size and oxygen content. This compares with $4 per lb for commercial sponge of grade A-2. However, production of parts by powder methods results in practical elimination of scrap loss. Firm expects to be able to reduce prices before too long.

It is also claimed that the fire hazard is considerably reduced. Apparently the oxygen impurity tends to locate on the surface of the particles forming an oxide layer.

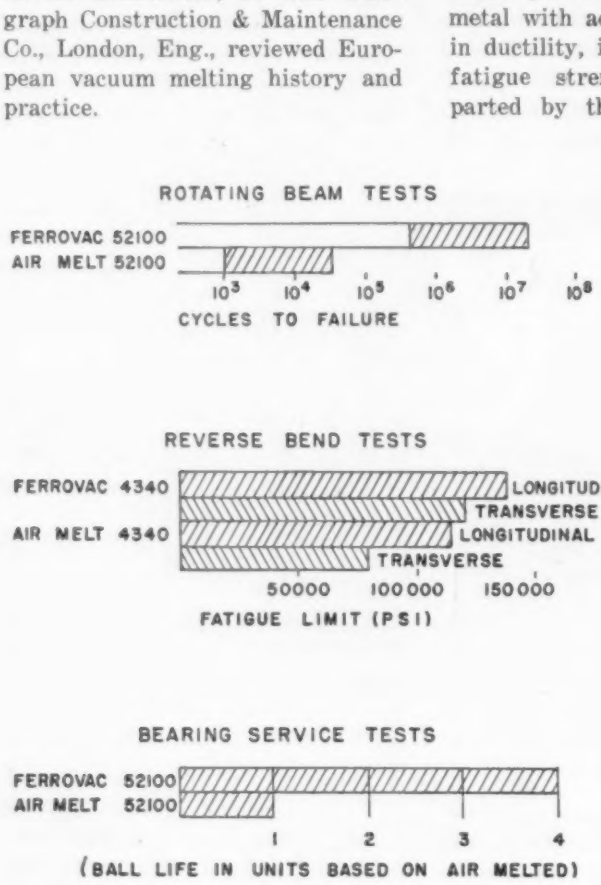
Firm also plans to market alloys both in powder and solid form. One such will be a master alloy ingot of aluminum containing 3 to 5 pct titanium.

High Temp Materials

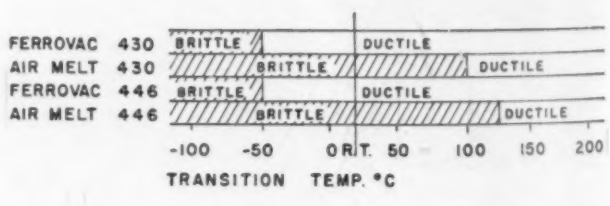
Air Force technical experts present in a new 91-p. report their findings in experiments with potential high-temperature materials.

The study notes that a composition with starting components of 95 pct CR_2Ti and 5 pct CR_2O_3 shows excellent high-temperature properties.

Office of Technical Services, U. S. Commerce Dept., offers the report, *New High-Temperature Intermetallic Materials*, at $2 per copy.



FATIGUE and service test data comparing air and vacuum melted alloy steels show marked improvement in physical properties for the latter. Ferrovac is a trademark of the Vacuum Metals Corp.



COMPARISON of impact properties of air and vacuum melted ferritic stainless steels shows why the vacuum melted steels can be used at such wide temperature ranges. Vacuum melted 430 and 446 stainless maintain their ductility down to —50°C while the air melted varieties become brittle at 100° and 125°C, respectively.

Charts courtesy Journal of Metals

FOUNDRIES: How to Watch Your Costs

Main areas in which foundry costs can be more closely analyzed and controlled are in the melt shop, molding shop, core shop and in cleaning and shipping . . . How to set up controls—*By T. M. Rohan.*

◆ "IF THERE ARE any two iron foundries in the U. S. with identical accounting systems, it's completely accidental," a leading foundryman told THE IRON AGE last week.

Occasion was introduction of a monumental cost accounting manual by the Gray Iron Founders Society, culmination of 5 years work by top authorities in the field and eagerly awaited by members of the association.

Failure to set up good cost accounting has been the death knell for quite a few in this highly competitive field. The way it happens is this, according to Eugene Hinze of E. T. Runge & Associates, Cleveland, one of three regional cost consultants for the society.

"Shrewd purchasing agents will farm out 10-12 patterns for quotation by independent foundries. If flat prices are quoted by one foundry, some of the high profit items will be skimmed off and given to other foundries who have broken down their costs much further and can therefore quote lower. Pretty soon the flat price foundry has only the 'dogs' left and his profits are going out the window."

This is especially true of auto firms in Michigan who know the cost as well as, and in some instances, better than the foundryman.

The general principles of breaking down costs as fine as possible, as outlined in the new manual, have already been applied by quite a number of leading foundries and proved successful in actual practice.

Get Yield Breakdown

On most foundry work metal yield on castings averages about 62 pct. On some jobs, however, it runs as high as 80 pct and on others as low as 30 pct depending on thickness of sections, complexity of risers, etc.

The new manual urges a breakdown of yield per job to within 5-10 pct and recommends setting up a table for permanent use. Thus if casting costs are quoted on the basis of $4 per hundredweight cost of metal only at the spout, high yield jobs can be quoted at $3.25 or even $3 in some cases and a profit will still be realized.

"The Little Things Get You"

One horrible example of poor cost control discovered last week was a foundry in the Chicago area. This average size foundry turning out about 150 tons per month was in favor of a good cost accounting system but never put one into practice. A society representative while passing through on a routine call found the plant deserted with the president in the process of packing his personal belongings before closing shop permanently.

"It's the little things that finally get you," he told the representative. "We followed our own rule of thumb on pricing here for years, mostly keeping an eye on competition. We finally ended up with 'bull pup' jobs in which there was no profit, we had outbalanced inventories and ulcerated salesmen."

"Have much trouble with absenteeism?"

How to Control Costs

The major areas in which foundry costs can be more closely analyzed and controlled, according to the new manual, are in the melt shop, molding shop, core shop and in cleaning and shipping. For the melt department, the book urges use of a detailed yield table showing percentage finished weight to metal consumed for all types of castings.

For the molding shop it suggests setting up a system of "cost centers" for varying types of equipment including units such as rollover machines, squeezers, sandslingers and a breakdown into a mold weight center. For the core room it suggests costs be related to weight of core rather than overall labor cost pro-rated by unit.

Costs also vary widely with bench, rollover and other types, it points out. For cleaning and shipping, the surface actually cleaned should be used as basis for costs, rather than the conventional use of weight of casting since they are not directly related. In this department the book points out, finishing usually represents 50 pct of costs, cleaning about 25 pct and inspection and shipping the remaining 25 pct.

The costs from these four major cost centers are applied to arrive at a total cost. To this is added loss factor from rejects and other causes and general overhead, both of which are pro-rated among the four departments.

MARKETING

ADVERTISING: Check Your Effectiveness

Here's a fifteen-point checklist to help you increase the effectiveness of your advertising . . . It applies to all industrial levels—anybody who sells anything . . . Ad men must think "marketing"—*By J. E. Borendame.*

1. Advertising is a powerful force and can serve to accomplish many corporate objectives. Understand the fundamental strengths of advertising. Use it as a management tool to solve management problems. Keep asking yourself "How can advertising help us solve this company problem?"

2. Work closely with every area of management, particularly market research, sales management and your advertising agency people in planning your advertising program. Determine what company sales objectives are. Translate these into advertising objectives.

3. Is your advertising program "defensive" or "offensive" — or both? Many companies give as much thought to holding their market position as they do to increasing it.

4. Make sure your advertising program is a "program"—and not a "project." There's a great difference. Don't be an "in-and-outer." Plan, schedule, contract, administer and control it as a program. In this way, everyone having anything to do with the program can work more efficiently.

5. Has market research or sales analysis identified your "hot" markets? Are you planning advertising that reaches these "opportunity" areas? Do you know the buying influences in these markets—or are you guessing who they are?

6. The alert, aggressive, scientific advertising man buys a well-considered percentage of his total space in those publications which he knows will reach his potential markets. Rely upon research to help you here.

7. This is the day of "integrated marketing." Try to plan, organize, coordinate and control all elements in your program. Coordinate your space advertising, sales literature, direct mail, trade shows, movies, publicity.

8. Advertising managers should establish a small percentage of their total budget to research their own advertising program.

9. If one of the objectives of your advertising program is to pull inquiries, are these really being handled efficiently, effectively and courteously? Do you qualify all of your inquiries, and to you keep accurate records of all sales resulting from advertising? Advertising men are always anxious to sell large budgets, but they should be just as concerned with all the techniques necessary to convert "business leads" into sales volume.

10. If your salesmen are handing out sales literature to your customers and prospects, do you know the reaction of the recipients? Is it really helpful to them- Do you know exactly how your salesmen use all of your literature as sales tools? Which pieces do they like, and which pieces do they refuse to use?

"She must be fairly tall, when you figure this is the third floor."

11. Get out in the field with your salesmen. Travel with them. Let your advertising people do likewise. Get the salesmen's and the prospect's reaction to your advertising program. Is it really helping the salesman sell?

12. Are you communicating the full details of your advertising program in three directions—up to your top management, sideways to your own department people, and down to all levels of employment in your company. People do not believe in programs which they do not understand.

13. Be responsible for building "your corporate face." Strong trademark identification in your advertising, on your literature, letterheads, signs, trucks, invoices, business cards, packages will help.

14. If your advertising program carries a strong "core idea," be sure it is multiplied and intensified by continual use in your sales literature, trade shows, movies, etc.

15. Your entire advertising program will be no better than the kind of "thinking" you are able to put into it. This thinking must be done if results and effectiveness are expected. Others cannot do this for you. Organize yourself and your work so that you are the creative man your company expects you to be Be your company's "idea man." Think in terms of growing from "advertising man" to "marketing man."

Mr. James E. Borendame is Director of Marketing Services of Acme Steel Co., Chicago

STEEL: Eaton May Get Follansbee

Republic facilitates sale to Eaton who will operate plant at Follansbee for 3 years . . . Richmond still holds Federal Enameling and three steel warehouses . . . Sale expected to stand.

♦ NEW BUYER of the Follansbee Steel plant is Cleveland financier Cyrus Eaton who has agreed to operate the facilities in Follansbee, W. Va., for at least 3 years.

Sale of the steel finishing plant and equipment to Eaton interests was facilitated by Republic Steel president Charles M. White, who released middleman Frederick W. Richmond from his agreement to sell to Republic.

Both Mr. White and Mr. Richmond gained stature by their magnanimous actions at a time when they seemed innocently caught in a crossfire of public opinion.

The Follansbee deal dates back to last summer when Marcus A. Follansbee, son of one of the founders, had agreed to sell the mill to Frederick W. Richmond, New York financier, for $9.2 million. Sale was approved by a majority of Follansbee stockholders.

Some Opposed Sale

Mr. Richmond in turn had agreed to sell the steel finishing facilities to Republic Steel Corp. which planned to move most of the equipment to its Gadsden, Ala., plant.

Minority stockholders opposed the sale vigorously, raising a rumpus that echoed all the way to Justice Dept. and Congress.

They also filed suit in U. S. District Court at Wheeling, W. Va. Decision of this court last week overruled the majority stockholder vote approving the sale. A condition of the court decision was that the minority stockholders were to have put up a bond. But it is expected they might now let the sale to Mr. Richmond stand.

However, Mrs. Aline Warner of Greenwich, Conn., who also wants to buy the plant, late last week urged a special meeting of shareholders be called to consider all offers.

Sale to Eaton interests does not include the subsidiary Federal Enameling & Stamping Co. and the three Follansbee warehouses which will still be owned by Mr. Richmond.

Mr. White said he was releasing Mr. Richmond from his commitment because of the Eaton offer to run the plant in Follansbee for 3 years. "It is Republic's constant aim to stimulate employment. Although the machinery and equipment are ideally suited for our Gadsden, Ala., operations and are now needed there, we do not wish to interfere if the mill will continue to operate at Follansbee. This is not a change of position, it is simply a change in circumstances."

"We realize, of course, that the shutting down of the Follansbee mill would cause some hardship in the community. However, we felt that since the directors of Follansbee had decided to sell the plant because it was losing money and since Mr. Richmond had not found a buyer who was willing to operate it, a shutdown and dismantling of the mill was probably inevitable, even if Republic had never made its offer. This being the case, it seemed sensible to us to put the machinery and equipment to work in an area where it is now needed and where it could become a real competitive factor in an expanding market."

FINANCIER Cyrus Eaton (left) is new buyer of the Follansbee Steel mill. Here he is shown with W. J. Tuohy, president of the Chesapeake & Ohio RR of which Mr. Eaton is chairman of the board.

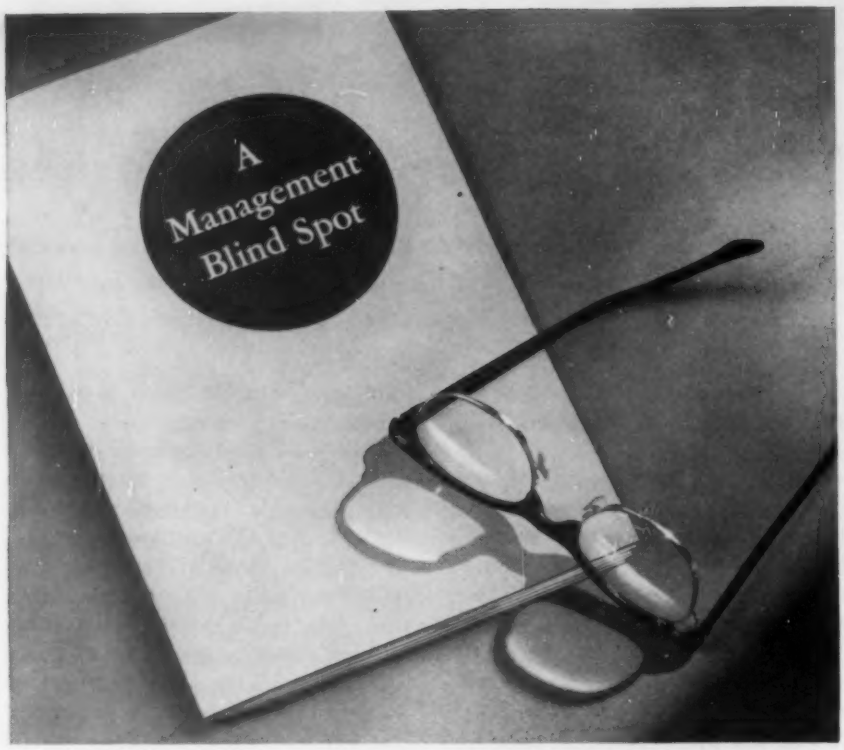
Richmond Agrees

Mr. Richmond said, "After carefully investigating the Eaton offer to operate the Follansbee properties at Follansbee permanently and after assuring myself that the mill could be operated profitably due to Mr. Eaton's ability to furnish properly-priced raw materials, I agreed to allow Republic to withdraw in favor of the Eaton offer. This decision was made solely in the interests of the town of Follansbee, W. Va., and at a substantial personal financial sacrifice.

"It means a great deal to me that my name will continue not being associated with liquidations. It is my intention to operate the balance of the Follansbee properties including the Federal Enameling and Stamping Div. which has an annual volume of $14,000,000 and the three warehouses which do a volume of $4,000,000."

Mr. Eaton said, "It is a credit to Mr. White, Gov. Marland and United Steelworkers president McDonald that they have worked out a way to save Follansbee Steel Co. for the community and preserve 700 jobs. Republic Steel has shown business statesmanship in its action.

"My associates and I are ready



FREE BOOKLET challenges management to evaluate methods of meeting work specifications . . . suggests ways to raise quality standards for less money.

New Light on Hidden Losses

How open-minded are you? Enough to read a booklet that may redden your face?

For, this booklet is one of the frankest revelations of a common management failing ever published. It charges executives of many firms with paying too little attention to knowing that the goods are made right.

Provocative challenges appear on just about every page. Maybe you can prove that they don't apply in your plant. But until you do, you may be missing opportunities to improve quality at lower costs.

For example, the statement is made that the amount of work that fails initially to meet specifications runs anywhere from 5 to 30 per cent of total production . . . and suggestions are given to help you prove or disprove it. The charge is also made that three out of four micrometers (generally accepted in the average shop as the symbol of precision) are worn beyond being accurate or are out of calibration . . . and suggestions are given to aid analysis and correction of the situation.

This booklet is the easiest reading this side of your favorite comic strip. The cartoons and captions are typical of the writer's dynamic technique. It may be damning; but it's never dull.

Write for your free copy today. The fifteen minutes you'll spend reading "A Management Blind Spot" may be the most profitable investment you have ever made.

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to go forward in preserving employment and prosperity in Follansbee, W. Va."

Mr. Eaton is not a newcomer to the steel industry. He is chairman and president of Portsmouth Steel Corp., which some years ago sold its operating facilities at Portsmouth, O., to Detroit Steel Corp.

The Portsmouth company currently holds a 16 pct interest in Cleveland Cliffs Iron Co. and 25 pct interest in Detroit Steel Corp.

Mr. Eaton is also chairman of the Chesapeake & Ohio Railway, chairman of West Kentucky Coal Co., and chairman of Steep Rock Iron Mines, Ltd.

Industry Pay High

Factory employees are in better position to buy consumer goods as a result of a rise in take-home pay.

Net spendable weekly earnings, says U. S. Labor Dept., averaged $59.84 for the worker with no dependents and $67.07 for the man with three dependents in October. In each case, the average was 29¢ higher than in the previous month.

Gross weekly earnings were higher by an average of 8¢ than in October last year. This factor, coupled with the federal income tax reduction which went into effect early this year, produced a pay envelope that set an October record.

CORE production turntable.

EXPANSION

Open New Ingot Mold Foundry

U. S. Steel producing in modern unit at Thomson Works . . . Supplies molds for plants in Pittsburgh-Youngstown area and Fairless Works . . . Replaces 50-year-old plant.

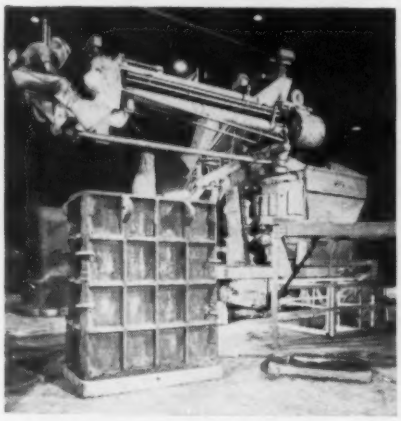
◆ U. S. STEEL'S new ingot mold foundry, billed as "the most modern in the industry," is in production at the Edgar Thomson Works, Braddock, Pa.

The foundry contains the latest equipment for materials handling from sand storage to finished casting. Five dust collectors and 16 exhaust fans plus other equipment for minimizing dust assure a relatively clean operation.

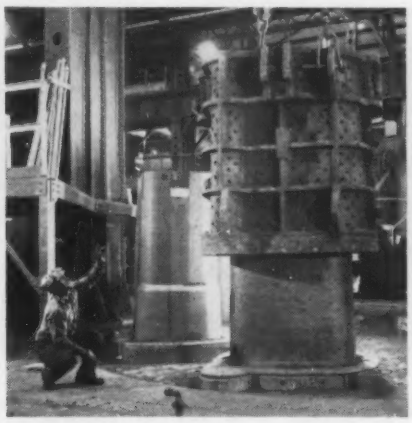
Annual capacity of 275,000 tons will be used to supply molds for U. S. Steel plants in Pittsburgh, Youngstown and at the Fairless Works. Occupying a 2-acre site near blast furnaces, the plant is capable of making molds weighing 35 tons and 110 in. high.

Belt conveyors move sand to the foundry from bins housing 100 tons of new sand and 200 tons of reclaimed sand, with reserve space for 250 additional tons. The ovens can handle over 1000 tons of molds daily.

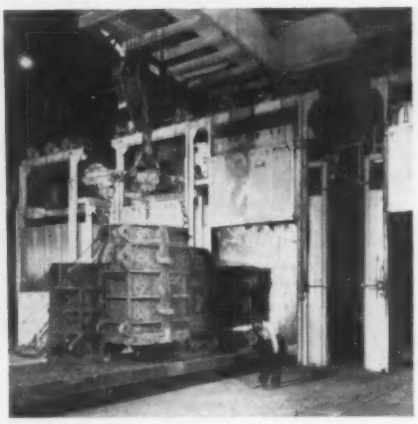
U. S. Steel has produced ingot molds at Edgar Thomson for many years. Buildings and equipment in use over 50 years were dismantled to make room for the new plant.



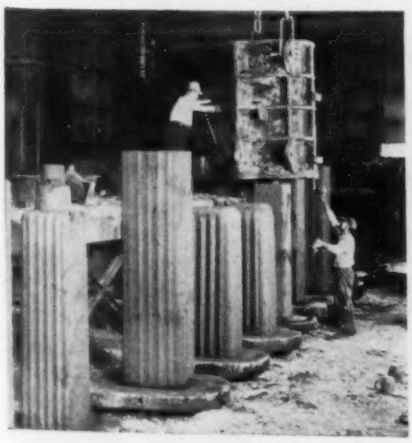
RAIL-mounted sand slinger ramming up sand in core box on turntable.



FLASK being lowered over iron mold pattern just prior to ramming.

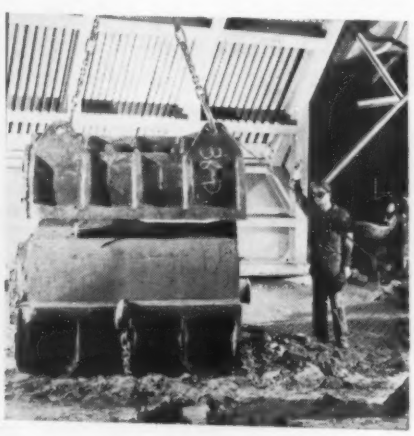


DOWNDRAFT ovens dry molds, cores at temperatures up to 750°F.



FLASK containing dried sand mold being lowered over core.

CASTING ingot mold from 20-ton ladle. Molds weigh up to 35 tons.



REMOVING flask after cooling. Floor grids dispose of sand.

MAGNESIUM: Velasco Still Stalemated

Fate of government-owned plant still unknown . . . Defense Dept. stands by essential decree . . . Dow unwilling to keep it running unless sale is approved . . . See production dip—By *R. L. Hatschek.*

◆ QUESTION of what will happen to the Velasco magnesium plant is still unanswered less than 60 days before operations are scheduled to cease. Dow Chemical Co.'s twice extended lease on the government-owned plant will expire Jan. 31 and nobody — Dow, General Services Administration and Defense Dept. included—knows what will happen as of Feb. 1.

Defense Dept. has ruled continued operation essential, has not changed its opinion and is not likely to. Reason is mathematical: Monthly consumption of primary magnesium is about 3300 tons. Capacity of Freeport, the only other major facility in operation, is only about 2500 tons a month. Mitigating the situation is a healthy inventory of metal now held by Dow —but an 800-ton monthly deficit probably wouldn't take too many months to chew this up.

What's the problem? Why not keep the 3700-ton-per-month Velasco plant running? More mathematics: Full-time production would result in a monthly oversupply of perhaps 2500 tons—and the stockpilers don't want any more magnesium! And low-level operations would hardly prove economic.

Dow doesn't want to continue running the plant unless the firm can buy it. But Justice Dept. has ruled the sale, which GSA would approve, would conflict with anti-trust laws. And nobody else wants to buy it.

The 10-year-old facility needs modernization for more efficient operation. Dow would naturally be reluctant to spend money for this if the best it can do is get a 3-year lease. The firm would rather put the capital in enlarging its own Freeport plant. This, however, would take time.

Right now the Freeport plant is running at a good clip—though not 100 pct—and Velasco is being operated at perhaps two-thirds of capacity. This means a monthly rate of about 5000 tons and is confirmed by the latest Magnesium Assn. statistics showing October production at 5148 tons. This brings the 10-month total to 58,852.

Production this month is another question mark. With shutdown now scheduled for the end of next month, output will probably begin to be curtailed during December. This is what happened in September when the shutdown was scheduled for Oct. 31. Probable total production for 1954 will be about 68,000 tons, perhaps more if an early decision is made to maintain Velasco operations.

Dollar volume of the industry this year is off about 20 to 25 pct.

Wrought magnesium shipments, which picked up nicely when Dow's new mill at Madison, Ill., came into production at mid-year, slipped somewhat in October. Plagued during construction by everything from slow delivery of electrical equipment to labor difficulties, the Madison mill is now operating at less than eventual capacity due to usual technical bugs encountered in a new operation.

But it's still bad enough to have stretched out delivery time on magnesium sheet. Sheet and plate account for about half of wrought product total. To help ease this temporary shortage condition, Aluminum Co. of America has reactivated its magnesium rolling mill at New Kensington, Pa., on a short-term basis. Current order from Dow is expected to keep the mill busy for at least 3 months. The Alcoa mill, which was deactivated when Dow's started up, began rolling the Dow slabs on Nov. 21.

Who Are Magnesium's Customers

Distribution by End Use
Primary and Secondary
Stockpile Excluded

	Estimated Net Tons		
	1953	1952	1951
Aircraft & Missiles	21,937	18,091	13,507
Aluminum Alloys	15,572	10,899	9,404
Cathodic Protection	5,005	2,987	3,918
Machinery & Power Tools	3,152	5,311	2,858
Titanium Production	2,966	....	....
Chemical & Metallurgical	2,904	3,983	2,766
Materials Handling	2,410	1,992	2,167
Consumer Products	2,225	996	738
Ground Transportation	1,483	2,545	3,503
Magnesium Powder	1,483	2,213	1,606
Electrical Equipment	618	2,397	1,613
Textile Machinery	433	387	369
Printing & Engraving	309	166	184
Miscellaneous	1,298	3,375	3,964
TOTAL	61,795	55,324	46,098

SCRAP: Hot Metal Slows Price Rise

Re-lit blast furnaces prove prime consumer weapon . . . Iron Age composite price drops from peak of $34 to below $33 in November . . . But higher ingot rates could again up prices—By *J. B. Delaney*.

◆ IN THE FACE of a rising ingot rate, steel producers appear to have reversed a trend toward higher scrap prices. From a peak of $34 in the weeks of Nov. 2-9, THE IRON AGE composite price dropped to below $33 the week of Nov. 23.

Scrap consumers used a ready weapon to stem the tide. They put idle blast furnaces back into production to lessen their dependence on scrap in openhearth melts.

Could Rise Again

But their victory may be only temporary. Any of a number of factors could start scrap prices back up again, despite the "equalizing" influence of hot metal from the blast furnaces. Probability of still higher steel production rates in the months immediately ahead constitutes the biggest threat.

Other potential factors that could strengthen scrap prices include (1) effect of scrap exports on available supply, (2) a severe winter, (3) lower inventories in dealers' yards and consumers' plants, (4) better steel business than had been anticipated, and (5) rising operating rate of electric furnaces, which use a 100 pct scrap charge.

As the ingot rate rises, the mills' hot metal weapon tends to lose its potency. Also, blast furnace capacity is not spread evenly among steel companies in relation to individual company steelmaking potential.

That is, one scrap consumer might have an overabundance of hot metal while another may not have enough. The latter mill could upset the apple cart by bidding up prices to get the scrap it needs.

In the six-year period since 1949, expansion of blast furnace capacity, while substantial, has lagged percentagewise behind increase in steelmaking capacity. Blast furnace potential at start of 1954 was 82 million tons compared with 67.3 million in 1949—a rise of 21.9 pct. In the same period steel capacity rose from 96.1 million to 124.3 million or 29.3 pct. Ratio of blast furnace to steel capacity dropped from 70 pct in 1949 to 64.3 pct this year.

Commerce Sets Rules

Both the steel industry and the scrap industry are aware of the potential effect of exports on scrap prices. Prices were soft-pedaled during recent discussions

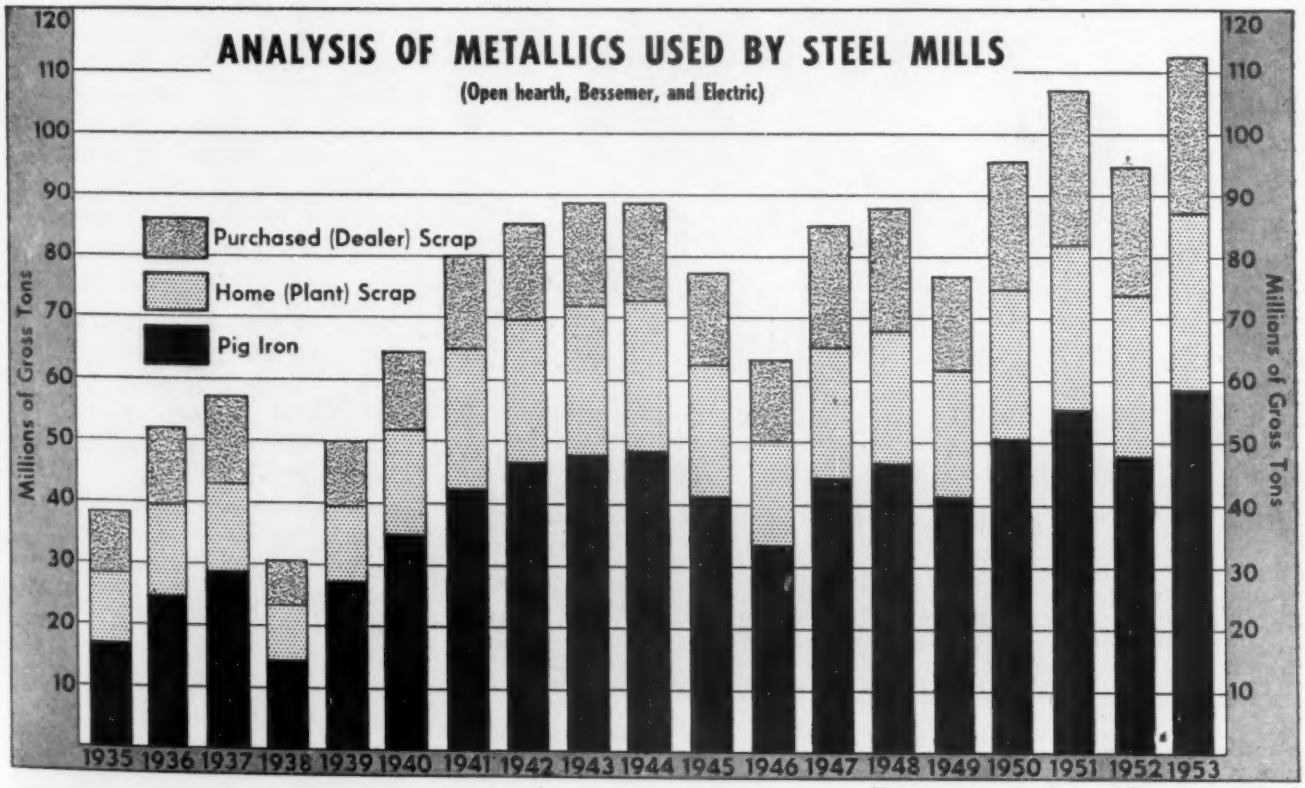


Chart courtesy Institute of Scrap Iron & Steel

UNION WIRE ROPE CORPORATION

ACHIEVES

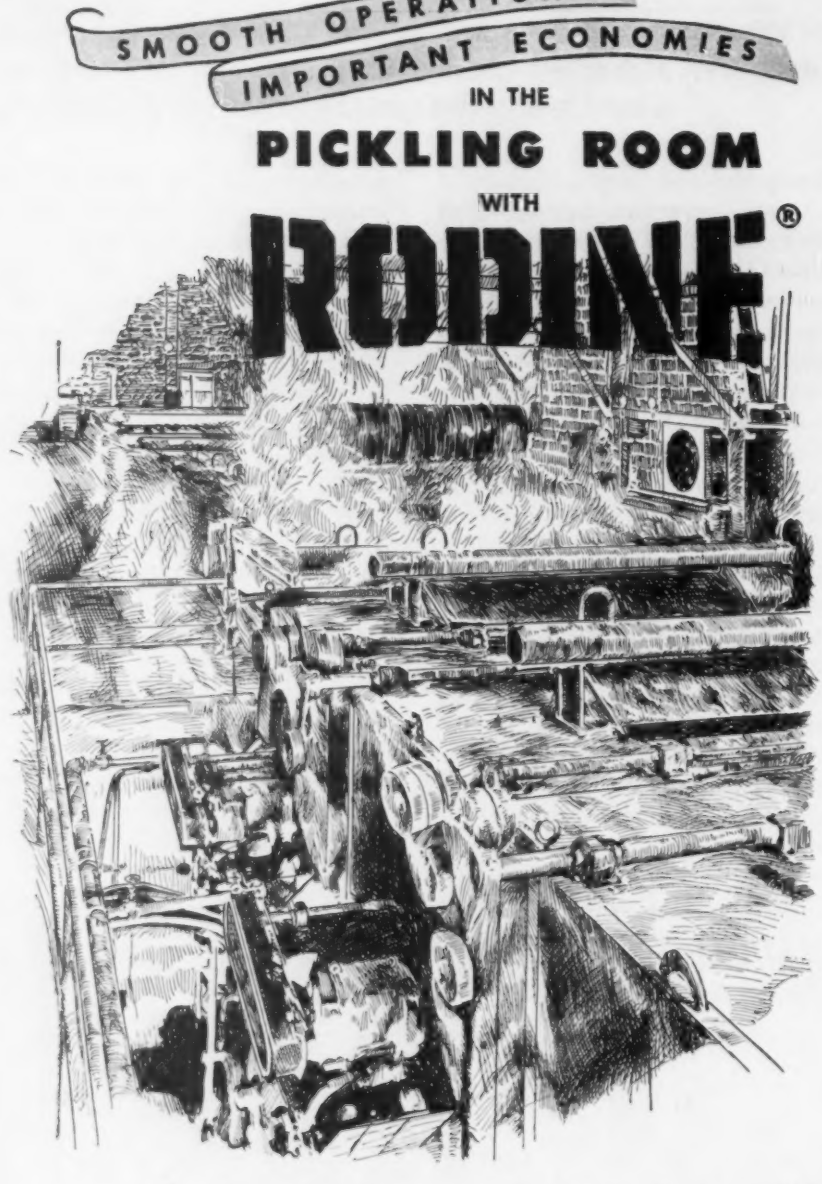
SMOOTH OPERATION—
IMPORTANT ECONOMIES

IN THE

PICKLING ROOM

WITH

RODINE®



Rod and wire are pickled clean with "Rodine" without wasting either acid or metal. Breakage in drawing from acid brittleness is minimized.

It is cheaper to pickle with "Rodine" than without it.

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with Commerce Dept. over rising exports but everybody knew it was a factor, along with the publicized one of national defense.

Commerce Dept.'s final action on the question upheld the scrap industry's contention that restriction of exports is not justified. At the same time, CD reserved a couple of weapons to use if the flow of scrap from this country gets out of hand.

What Commerce Dept. Did

The Department (1) cut time on export licenses to 3 months compared with the former six months; requires applicant for license to certify that he owns or has a firm commitment for the scrap he proposes to export; (3) reinstated a provision that a copy of the customs record be sent to Bureau of Foreign Commerce so that export figures can be kept up to date compared with a time lag of one month to 6 weeks previously; ruled out for the time being any restrictions on exports. The new regulations will be in effect through March 31, 1955.

Observers pointed out that under these regulations CD could step in quickly to reduce exports should conditions warrant.

Meanwhile, it's estimated that scrap exports this year will run between 1.1 and 1.2 million tons compared with only 271,000 tons last year. Stepped up demand in Europe, Japan and Mexico accounted for bulk of the increase.

Inventories Down

Consumer inventories have dwindled from high levels of late 1953 and the first half of 1954. One consumer who held a stock of 120 days at the peak is down to 60 days, which is "normal" for the fall and winter months. Scrap dealers have also permitted their inventories to drop. Purchased scrap this year is expected to total about 26.5 million tons, allowing 1.5 million tons for export, compared with 31 million in 1953 and 34 million in 1952.

Recent "open" winters which permitted free movement and collection of scrap worked to the ad-

vantage of consumers. A severe winter would have the opposite effect.

The upturn in demand for stainless and alloy steels is bringing more electric furnace capacity into production which will give a healthy boost to scrap consumption. These specialty mills were harder hit than the so-called tonnage producers in this year's slump. The electric furnace shops have a greater effect on scrap consumption and prices in relation to tonnage produced than the openhearth plants that have hot metal available.

THE IRON AGE No. 1 Heavy Melting Steel Scrap Composite Price hit a low of $23.33 on Mar. 16. After that there was a gradual pickup and the price reached $28.58 on June 1. A third quarter low of $26.58 was reached July 13, after which prices rose steadily to the peak of $34 in fourth quarter.

Titanium:

DuPont cuts sponge prices . . . A-1 grade now $4.50.

Increasing production volume and improvements in technology are cited by E. I. duPont de Nemours & Co. as major factors in enabling a price reduction in titanium sponge. The firm trimmed 22¢ from the grade A-1 (0.3 pct maximum iron content) price, bringing it down to $4.50 per lb. Grade A-2 (0.5 pct maximum iron) was cut 46¢ to $4.00 per lb.

This is the second price cut in the commercial history of the metal. Both were made this year. Price prior to 1954 was $5 per lb.

While duPont is not the sole producer of titanium sponge, the only other firm currently in commercial production does not sell sponge but mill products. DuPont does not fabricate the metal.

DuPont and Titanium Metals Corp. of America are each currently producing at a rate of about 10 tons a day and several other firms are now building production facilities.

Effect of the price cut will be to improve the competitive position of titanium fabricators who do not produce their own sponge.

MANAGEMENT

STEEL: McLouth Rejects Offer

Several steel firms believed interested in acquiring McLouth . . . Latest bid by J & L turned down . . . Current expansion will increase value—*By R. D. Raddant.*

◆ DETROIT'S expanding McLouth Steel Corp. has been the object of more flirtations than the season's leading debutante.

But attractive as it is, located in the heart of the great steel consuming auto industry, it has some personality factors that make any suitor think twice before making a serious proposal.

Speculation of a probable purchase by one of the industry's larger companies has been continuous since the death some months ago of Donald McLouth, the company's founder and president. A stock situation gave rise to rumors that his estate would have to liquidate stock. It was also said that some major stockholders were willing to unload to an outside buyer.

Although no company statement has been made, it was reliably learned that Jones & Laughlin had made an offer. It was turned down, presumably until the expansion program now being completed was finished and in operation.

Would Help Many

Youngstown Sheet and Tube was one of the first to be linked with McLouth as a possible purchaser. Others included Republic, Pittsburgh Steel, National Steel and Colorado Fuel and Iron. It was also talked around Detroit that George Fink, former National Steel head, was a possible purchaser.

There are many reasons why McLouth is a desirable asset to almost any major mill. Its geographic location is an obvious one.

Turn Page

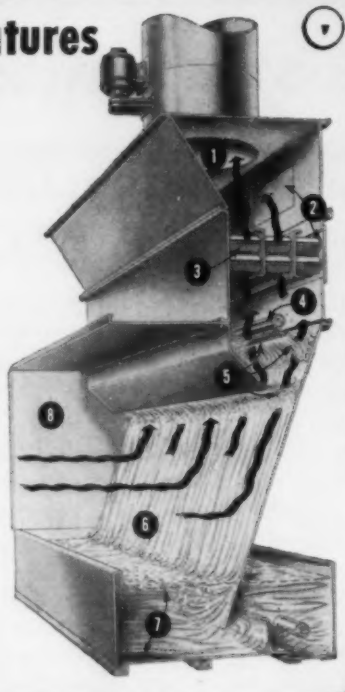
NEW president of National Association of Manufacturers Henry G. Ritter 3rd, right, accepts gavel from outgoing president H. C. McClellan.

WHAT'S NEW in water wash spray booths

9 money-saving features

1. The fan stays cleaner longer.
2. All parts of the booth are easy to reach.
3. Arrestors prevent moisture reaching stacks.
4. Clog-proof manifold assures unbroken water curtain.
5. Exhaust air is doubly washed.
6. Constant flushing keeps booth cleaner longer.
7. Overspray is washed into water pan for easy reclamation.
8. Rigid, long-life construction.
9. Costs less to operate.

MEETS REQUIREMENTS OF HEALTH APPROVED STATE & FIRE



New mass-production techniques bring down costs on water wash booths

Water wash spray booths have many advantages over standard dry-type booths, but until now booths of this kind have been too costly for many spray painting applications. Binks new Style D Water Wash Spray Booth is engineered to change all this. It is a simple, mass-produced booth that meets fire and health requirements. It is composed of strong standardized panels and parts which can be assembled quickly and easily. This new booth incorporates many of the time-tested features of the well-known Binks heavy duty Style DUC water wash booth. Several standard widths and heights are available direct from stock. And the cost is low! If you do spray finishing in your shop, Binks Style D Booth ushers in so many advantages and economies you can hardly afford to be without it.

Let us analyze your needs. Without obligation a Binks engineer will gladly call at your office to discuss the advantages of this new booth or to help you with spray painting problems of any kind. Just contact your nearest Binks office or write to the address below.

Ask about our free spray painting school... no obligation.

Binks
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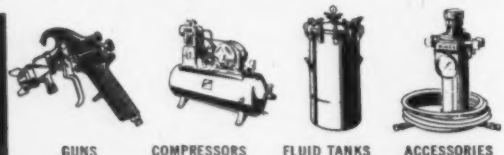

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Furthermore, the auto industry, specifically General Motors, has a heavy investment in the company. GM put up $20 million of the current $100 million expansion program.

Many people in the steel industry, even some who have used GM money themselves, are concerned over the possibility of the auto industry using McLouth as a "yardstick" for service and price, although there is no evidence that this has been done.

On the other hand, some of this very expansion has caused others in the industry to raise skeptical eyebrows. Some of the facilities installed are unconventional to say the least.

First, its 200-ton electric furnaces are the largest in the industry. The completed mill will not have openhearths but will employ the first oxygen converters to be used in the U. S.

Until the new blast furnace, the large electric furnaces, the oxygen units and new rolling facilities are completed and working, it is difficult to estimate how profitable the operation will be. That is why some of the mills, who would give anything to get a foothold in Detroit, are waiting to see how it develops before making a final proposal.

New Tool Plan

A new payment plan is being offered machine tool buyers by Gisholt Machine Co., Madison, Wis. The new plan would reduce down payment on a machine tool to 20 pct, carry payments 12 to 48 months, reverse the interest to allow the buyer to keep more cash in hand after his initial down payment.

The reverse interest allows the purchaser to reverse the normal system of interest payment on his note, pays interest in ratio to the amount paid in on the machine rather than the unpaid balance. On a $1,000 machine tool, then, with payments of $100 per month, he'd pay $200 down, then interest on $100 the first month, on $200 the second month, and on the total $700 only in the month in which the final payment fell due.

PRESSES: Sales Upturn Gains Power

Mild September rise picks up steam . . . Some makers will boost output 15 pct by first quarter . . . Backlogs trend up . . . Old customers still best as glamor wears off new markets—By K. W. Bennett.

♦ THE MILD UPSURGE in press equipment that began to be felt as early as 60 days ago is firming into something better. Business already booked for first quarter 1955 will take at least a handful of producers 15 pct above going fourth quarter production levels. An advance in press business hints more than better business for press builders. It is a firm advance, based on 1955 business prospects, in a capital equipment item.

It's notable that the business continues to come from old line markets. This is despite advances in plastic molding, powdered metal, and hot and cold extrusion that have captured the industrial imagination in the past five years. The advance in press sales can be traced to strengthened automotive, appliance, job stamping purchases, even some car building.

Backlogs Head Up

Expansion plans for these industries, rather than being crippled by the finished goods glut of latter 1953 and early 1954, seem destined to carry well into 1955 if press builders' prognosticating is correct. Press backlogs that dwindled like snow in the sun (cancellations hit 54.8 pct of the order book in first half 1954 against 17.8 pct in first half 1953, says Commerce Dept.) in first half were swelling slightly as early as September.

One builder could now operate for a year with business on the books. This figure is exceptional, but nearly all backlogs are rising at least slightly. One producer, for instance, employed a clever selling idea six months ago to boost a slow product, now has oversold this off-the-shelf item and is still extending delivery, reports an overall backlog of five months.

The backlog had taken a severe beating. New order average for all bending and forming equipment, of which presses represent over 75 pct, dropped from $20 million per month average in first half 1953 to $14 million monthly average in 1954. But shipments rose from $21 million per month average in first half 1953 to $23 million per month in 1954. At the same time, cancellations were further stunting the working backlog.

Press men predict two peaks will stand out for 1954. One in June, when new orders followed a general freshening of the business level, then went into a deep summer slump. At the present ordering rate shipments could hit a second half high in November.

To a man they'll agree, whatever the record for 1954, first quarter 1955 will exceed it by a conservative 5-10 pct. If egged into consulting their crystal ball, they'll agree that 1955 will better 1954 all the way, will equal the 1953 level.

Old Customers Best

Backlog may be backlog to everybody else, but to a sales chief it represents new sales. Reports of the sales drop in first half 1954 for presses only range from a lucky 3 pct below a year ago to a decidedly unlucky 50 pct. Producers supplying equipment related directly to the homebuilding splurge, particularly in the Midwest, were nearer the 3 pct figure.

Notable in 1954 has been some disillusionment with new markets. Some press builders, like Baldwin-Lima-Hamilton, have made a concerted bid for the plastics forming market, but the general reaction is that plastics have a long way to go. From a mass market potential, the same is true for hot and cold extrusion, despite considerable experimentation, particularly for the auto industry. Powdered metal forming gets the same reaction. The upturn is coming from the old market standbys, and a continuing high level through 1955 would come from the same sources.

The growing divergence in units sold by the press industry compared with dollar income is expected to continue. While labor and materials costs are advancing, main cause for the rise in dollar volume in the face of lower unit sales is the increasing specialization of the individual press. The three-press line that performed three operations, now consists of one press doing three operations—and faster.

Total press shipments for 1954 when the totals are in should be down. Dollar volume for the industry should be at least as high as 1953, probably slightly higher, representing higher cost per unit sold.

Press Deliveries, Dollar Volume

(including forging presses)

In	Press Builders Shipped	And Grossed
1950	14,998	$74,796,000
1951	20,033	$106,625,000
1952	17,128	$130,177,000
1953	19,840	$154,210,000

DEFENSE

Stockpile:

Goals are 61 pct completed. Selenium, nickel critical.

Government stockpile officials now have spent $4.2 billion to bring minimum mobilization supplies to 61 pct of completion, and have another $619 million worth of orders outstanding, Office of Defense Mobilization reports. But it indicates the rest of the program is going to be tough to fill.

In its semiannual report to Congress, ODM says that of the original 75 minimum stockpile goals, 30 are complete; 8 are between 90 and 99 pct complete; 19 are more than 50 pct complete, and only 18 are considered "critical" at less than 50 pct complete.

Details Are Classified

Details of the stockpile program are "classified" and not made public. But the report noted that under the new "long-term" stockpile, designed to insure domestic sources of vital materials, substantial quantities of lead and zinc have been purchased.

Iron and steel are not among the 40 minerals and metals on the list.

The report says that acquisition of aluminum for the stockpile has been stepped up as a result of government-sponsored expansions and that with minimum goals for metal grade bauxite about filled, officials are considering adding it to the government's long-term stockpile.

Selenium is considered the most critical stockpile material, since none has been delivered to the government. Nickel is also in short supply, which has prompted the government to increase by 75 pct the capacity of its Cuban plant, now at 14,000 tons a year, and search for new production methods of using domestic ores.

Minerals:

New mineral program would strengthen security.

National security and the forceful development of U. S. mineral resources are stressed in the new report to President Eisenhower by the cabinet committee on mineral policy.

Most important from the standpoint of national safety, according to the report, are recommendations that:

(1) All stockpile objectives for strategic and critical metals and minerals be reviewed completely and new long-term goals be established.

(2) There be a periodic weighing of the supply-demand situation for each metal and mineral to determine what level of efficient domestic output is needed to insure that this production fills its spot in the mobilization base.

(3) Office of Defense Mobilization, with the Interior and Commerce Depts. and other agencies, take a new look at the job to be performed in building and maintaining the mobilization base for metals and minerals.

To increase productivity in the domestic mining industry, the high-level committee proposes that the federal tax structure be reviewed to locate any obstacles to development of mineral resources.

It also suggests more and stronger government financial aid to private industry for exploration; an intensified program of Interior Dept. mineral and metal research; and establishment of a working group to improve contacts between the mining industry and the government.

Army Orders Drop

Army procurement and production spending during November dipped drastically below the pace of buying for the first 4 months of the fiscal year which began July 1. Awards for procurement and production total only about $85 million for November, compared with an average of more than $300 million a month during the summer and early fall.

Most of the procurement during November, some $80 million worth, goes for small orders of ordnance, signal and quartermaster materiel and equipment. During the July to September period, the Army purchased about $1 billion worth of goods, and spent $300 million in October.

Deeper Lake Channels

Channels connecting the Great Lakes should be dredged to a uniform depth of 27 ft, thus matching the planned depth of the St. Lawrence Seaway, says a field recommendation from the Corps of Engineers.

Controlling depths of present channels are 21 ft for upbound and 25 for downbound traffic. Deepening of them to 27 ft would cost the government an estimated $109 million.

The Board of Engineers for Rivers and Harbors, Washington, is reviewing the recommendation. Industry executives and others interested in the proposed work may send their comments to the board before Dec. 30.

Copies of the field report may be inspected at Army Engineer offices in Chicago, Detroit, Duluth, Milwaukee, and Buffalo.

Fabricated Structural Steel

Contracts, Shipments, Backlog

	1954	1953	Estimated Net Tons Avg. 1947-50
CONTRACTS CLOSED			
October	206,761	190,656	223,280
Year to Date	2,110,764	2,428,850	1,967,748
SHIPMENTS			
October	254,507	295,459	185,785
Year to Date	2,679,348	2,592,941	1,874,908
BACKLOG	1,293,779	1,927,240	1,364,772

Source: American Institute of Steel Construction

Report To Management

If it hadn't been for the Army-McCarthy hearings there's a good chance the name H. Struve Hensel wouldn't mean anything to you. Assistant Defense Secretaries don't often make the headlines.

But it's becoming increasingly apparent that he's one of the most outspoken, clear-thinking members of the Administration's high command.

While higher-ups weasel-word and confuse the public with vague pronouncements, the Asst. Defense Secretary has done his best to outline as specifically as possible the Administration's policy, particularly on foreign affairs. The only trouble is nobody hears him. His speeches are usually given before small gatherings where press coverage has been unaccountably poor.

In one of these recent cloakroom confabs he gave a piercing analysis of why the Administration wants a more liberal trade policy. This you know can't miss being a big issue during the next session of Congress, and the odds favor those backing a freer trade program.

The Administration's argument for more liberalized trade shapes up this way: Mutual trade is the only way the free nations can be bound together permanently.

This means lower tariffs which can't help but upset some segments of our economy. And if you happen to be in the segment that's hurt, it's not so easy to be broadminded. But the fact remains that treaties, gifts, loans won't do the job. Our allies have to develop their own economic strength to be able to resist the threat of Communist infiltration. To do this they must have markets for their goods.

Stripped down the problem is this: We have to keep our own economy strong which means there must be a certain amount of tariff protection for our industries. On the other hand we must also cement relations with our allies through more trade. Goal of the Administration's plans and the Randall Commission recommendations is to achieve both these ends through a compromise.

The Administration knows freer trade can't help but hurt certain industries which are virtually dependent on tariff protection for their existence. For some others tariffs are the difference between subsistence and prosperity. In cases where these jeopardized industries are militarily essential, protection will have to be kept in effect. In other cases, the Administration view is that the common good of the nation is more important than the welfare of individual firms and certain communities.

Relaxation of tariffs, of course, isn't all bad so far as our domestic economy is concerned. It will hurt some people, benefit others. Undoubtedly a freer trade policy would do much to ease our farm surplus problem for example. Foreign countries would have a greater inclination to buy our foodstuffs and would have more dollars to pay for them.

Overall approach of the Administration on foreign trade is this: We won't risk our industrial and economic strength for a fling at an economic ideal. But we also have to remember that trade restrictions do not necessarily benefit everyone in the country. What we have to do is weigh the advantages of closer trade ties with our allies against the bad effect trade liberalization may have on our domestic economy.

Latest government report shows that personal income in October was running at an annual rate of $286 billion, down $700 million from September levels. The decline was attributed to a decrease in farm income. Wages paid by private industry actually showed a small gain. Reflecting the improvement in the labor situation, unemployment payments were down slightly during October.

INDUSTRIAL BRIEFS

Gets Contract . . . Kaiser Metal Products, Inc., Bristol, Pa., has been awarded a contract by a leading aircraft engine company for a number of stainless steel jet engine components.

Dividend . . . Scovill Mfg. Co., Waterbury, Conn., has declared a dividend of 50¢ per share on the common stock, payable Jan. 1 to stockholders of record at the close of business Dec. 10. This dividend will mark the 100th consecutive year that the company has paid dividends on its common stock.

Coming Up . . . Cleveland Chamber of Commerce groups are holding a Northern Ohio Personnel and Executive Conference next month Jan. 13-14 at the Hotel Carter, Cleveland.

Elected . . . J. S. Besser, manager of fuel sales, Colorado Fuel & Iron Corp., New York, was elected director of the National Coal Assn.

They've Moved . . . Drever Co., has moved to Red Lion Rd & Philmont Ave., Bethayres, Pa., from 736 E. Venango St., Philadelphia.

Key Award . . . The Wolverine Tube Diamond Key Award was presented to Ferruccio Rasori for outstanding technical papers in the refrigeration field. Awarded annually since 1940 the award was given to Mr. Rasori of Kolostat Heating System, Ltd., Montreal, for his outstanding article, "Cooling Potential vs. Specific Enthalpy."

Purchased . . . Babcock & Wilcox Co. has purchased the assets and business of Globe Steel Tubes Co. of Milwaukee.

Acquired . . . Riverside Metal Co., Riverside, N. J., has been purchased by H. K. Porter Co., Inc.

Big Order . . . National Trailer Pool Inc. ordered 100 new Fruehauf convertible volume van trailers from Fruehauf Trailer Co.

Across the Nation . . . General Motors Corp.'s compilation of attendance reports shows a total of 1,024,027 persons visited 125 GM plants and training centers across the nation during GM's "Open House to America."

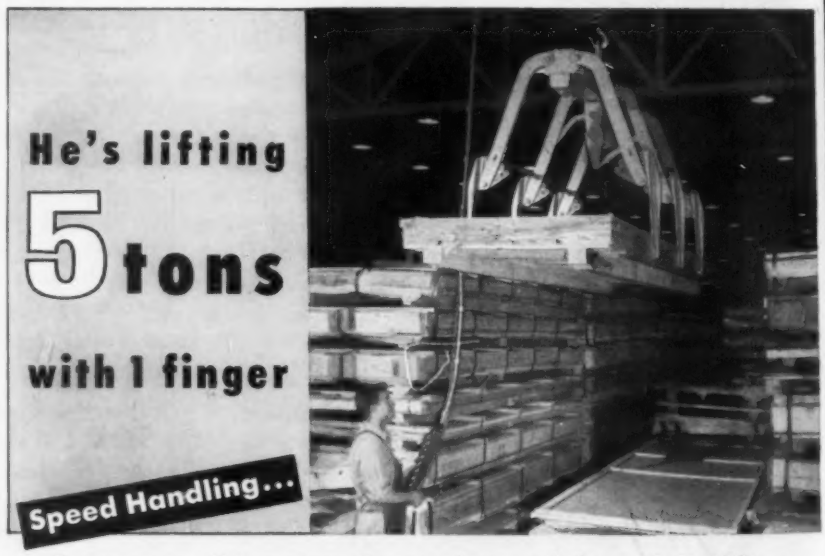
Participating . . . Ryan Aeronautical Co., San Diego, will participate in the construction of America's first jet tanker-transport, the U. S. Air Force's new Boeing KC-135.

Expands . . . Efficient Tool & Die Co., announced the start of construction of a second plant in Cleveland.

New Representative . . . Cochrane Corp., Philadelphia, has appointed Turbine Equipment Co., Glens Falls, N. Y., as its representative for the Northeastern New York State area.

Expansion . . . American Research Corp., Bristol, Conn., recently completed an addition to its plant which is designed to double its manufacturing capacity.

New Plant . . . A new plant has been opened in Madrid by Worthington Corp.'s Spanish associated company, Bombas y Construcciones Mecanicas Worthington, S. A.



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To our Favorite Boss!

From the receptionist at the front door through to the last man on the loading platform—*all* of us here at Great Lakes Steel have a very important *something* in common. It is the knowledge that your continued and expanded need for our products determines the future and growth of every one of us, regardless of our individual jobs here.

It is the knowledge that *you*, Mr. Customer, are the boss!

That's why we at Great Lakes are seeing to it that our steel is the kind you have a right to expect from a specialist in flat-rolled products. We know the importance of prompt shipments, top quality, proper packaging and loading, dependable information, and clerical accuracy. We think you'll agree that our many satisfied customers are a pretty good indication that this policy is good business for all concerned.

Next time you have a problem in steel, call on one of our representatives to help you solve it. You'll be glad you did!

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AUTOMOTIVE ASSEMBLY LINE

Automakers' Plating Research Pays Off

Stylists make better use of brightwork . . . Producers make better brightwork . . . Four GM divisions have new plating facilities . . . Each claims best . . . Describe Pontiac automatic unit—*By R. D. Raddant.*

◆ GENERAL conclusion reached from looking over 1955 models is that automakers are making better use of brightwork in styling. But more important is that they are simply making better brightwork.

And very little of this improvement is due to increased availability of nickel, that all-important ingredient in creating a bright, corrosion-resistant finish to bumpers and other plated parts.

Probably at no period in history have the auto and plating industries invested so heavily in research and facilities to improve the quality of shiny parts in the face of a nickel supply that could hardly be called adequate.

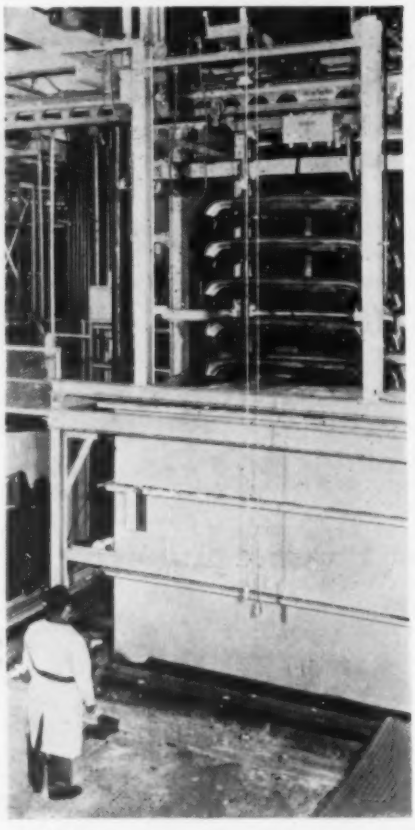
All Claim Best . . . Pontiac, Cadillac, Oldsmobile and Chevrolet among the GM divisions have all installed new facilities in the past year. Each division lays claim to having the most modern and efficient operation in the automotive industry.

Without attempting to judge all on their respective merits, the new bumper plating unit at Pontiac is an excellent example of what is being done to assure a good, lasting finish on the functional bumper parts.

Unit was developed and engineered by Udylite Corp., Detroit, and was installed at a roughly estimated figure of about $4 million. Its fully automatic selective cell concept is unique in the industry. And it is the only straight through unit that takes the bumper through all the plating cycles without further preparation of the surface after it enters the machine. It stretches 450 ft in length, is 15 ft wide and 18 ft high.

Five-Part Bumper . . . A little explanation of the Pontiac bumper is required to illustrate the time cycle. Each car has two wrap-around units at the rear, two upper curved bars and a lower, long unit across the front. This is a total of five different bumper parts for each car. The unit, which has a 2-minute plating cycle, has a capacity of 130 sets of the five parts per hour.

The cell plating concept was developed by Udylite as the best method to assure a uniform finish on all parts of the curved bumper. The anodes in each cell are hung to approximate the curved shape of the bumper. Rack is lowered into the cell where it remains until its plating cycle is completed.



PONTIAC bumper parts begin a 450-ft trip through the selective cells of the Udylite plating machine for cleaning, plating and rinsing.

The fully automatic selective cell machine operates on a skip transfer principle. As each rack moves along the conveyor, it selects an empty cell in each plating sequence as it moves through the complete cycle. Entire operation is automatic, with only the loading and unloading of the rack done manually. Entire cycle from loading point to unloading point is 3½ hours.

Holds Specs . . . It is expected that the unit will consume 50,000 lb of nickel per month. While nickel is far from easy on the market, Pontiac is able to hold to GM plating specifications. This consists of 0.0007 in. of copper, 0.0008 in. of nickel, then a chrome flashing.

Udylite started work on the unit more than two years ago when it was learned that Pontiac intended to put in a new facility for bumpers. This company, a specialist in plating equipment and materials, developed a working model that itself cost between $60,000 and $70,000 just to "sell" the job to Pontiac. It is now gathering dust in some Udylite storeroom. Floor was broken for installation in November 1953 and production, for 1955 cars, was started in October 1954.

Detroit Notes . . . At least two automakers will set all-time records in 1954, a year that is going to turn out better in terms of total production than was predicted. Late last week Oldsmobile surpassed its

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Dec. 4, 1954	144,677*	22,816
Nov. 27, 1954	115,713	19,145
Dec. 5, 1953	101,996	21,152
Nov. 28, 1953	65,127	18,163

*Estimated. Source: *Ward's Reports*

previous top production of 396,757. At the same time, Cadillac left behind its previous best record of 110,535. Both former records were set in 1950.

Packard:

Manufacturing setup, product completely revised.

Packard will wear a new look in manufacturing as well as styling and engineering when its 1955 models roll off assembly lines for January introduction.

Both phases of the business, the manufacturing setup and the product itself, have been completely revised under the administration of James J. Nance, president of Studebaker-Packard Corp. since the merger of the two independents earlier this year.

Packard and Clipper models have been completely restyled this year with a new V-8 engine to power the lower, longer appearing cars with the added visibility that has swept through the industry within a single year.

Has New Suspension

But perhaps the biggest single factor in Packard promotion will be the torsion bar suspension, which will be used for the first time on a production automobile in this country.

It will probably be controversial to some extent, as any first is apt to be in such a competitive field as the auto business. A preview ride disclosed that it is superior in ride qualities to other luxury cars, particularly when taken over a rough, pitted road. The torsion bars provide an ultra-smooth ride over even the most bumpy surfaces.

Using the torsion bar suspension as the focal point, Packard will make riding comfort its big selling point for 1955, Mr. Nance disclosed. Its advantage includes a constant riding height and greater stability in higher speed ranges.

This doesn't mean that Packard won't make the most of its new V-8 engine, which will be right there with any in horsepower and performance. Official ratings are still confidential until announcement date, but previous predictions have been very close.

The new Packard and Clipper cars will show a wider separation of the two lines than was possible with previous Packard styling. Packard will have the job of regaining some of its lost top bracket market while the Clipper will probe the medium field.

The new cars are being built at two plants, a complete revamping of Packard's manufacturing within a year. The V-8 engines, new twin-Ultramatic transmissions, and chassis parts are manufactured in a spanking new plant at Utica where the latest automatic methods are being utilized. Body and final assembly operations are carried out at the modern Packard Conner St. plant, purchased from Chrysler some months ago.

Packard and Clipper lines will complete the front of the new

AUTOMOTIVE NEWS

Studebaker-Packard Corp. for its first full year of competition. Result is a complete line of cars for four distinct price classes and commercial trucks in the light and medium groups.

Mr. Nance said the new company will be set up to produce all lines with a maximum of integration without sacrificing product distinctiveness and other benefits of decentralization.

A market of 5,600,000 cars was predicted for 1955 by Mr. Nance, an optimistic figure in itself, but still slightly behind the 5,800,000 predicted by Harlow H. Curtice, GM president.

Order Huge Generator

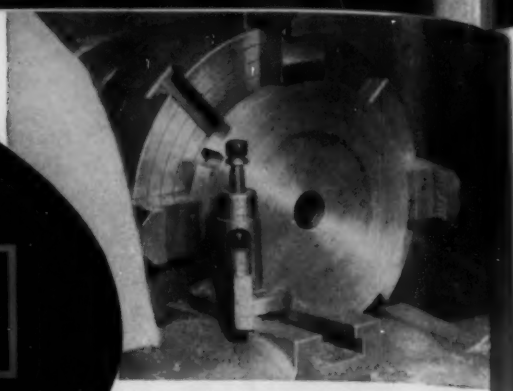
Detroit Edison Co. will soon install what is claimed the world's biggest steam turbine generator at its River Rouge plant. The 300,000-kw unit uses a cross-compound turbine designed for an initial pressure of 2400 psi and temperature of 1050°F.

THE BULL OF THE WOODS — **By J. R. Williams**

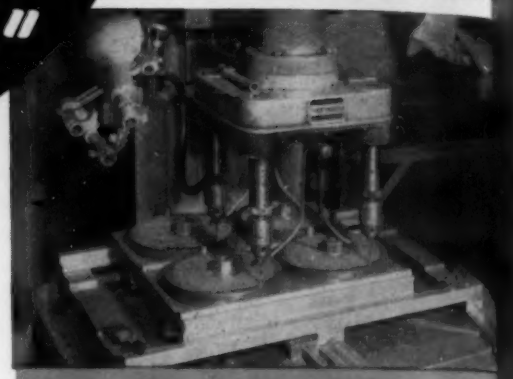
HE'S IN A MESS--HE'S SUPERSTITIOUS AND TH' BULL AIN'T.' HE'D LOOK SILLY GIVIN' TH' WATCHMAN'S CAT TH' RUNAROUND, SO HE'LL JUST HAVE TO WAIT FER BAD LUCK TO BEFALL TH' BOTH O' THEM!
HE'S SILLY, BUT I'D THROW MY HAT AT TH' CAT AND SAVE TH' DAY FOR HIM, ONLY I'M AFRAID IT WOULD RUN AROUND BEHIND THEM AND IN FRONT OF US!
12-10
J.R.WILLIAMS
HEROES ARE MADE-NOT BORN
T. M. Reg. U. S. Pat. Off.
Copr. 1954 by NEA Service, Inc.

for these parts at
Pittsburgh-Erie Saw Corp . . .

"Latrobe's FM Steel a must"



Photographs Courtesy of Pittsburgh-Erie Saw



Tool life increased 40% when machining Latrobe's "Free-Machining" BR-4 FM at Pittsburgh plant.

Pittsburgh-Erie Saw Corp., Pittsburgh, Pa., reports . . . "Because of the greater ease of machining BR-4 FM, we are reducing our production costs and especially increasing our drill life. Savings in production time combined with greatly increased tool life makes Latrobe's FM steel a must."

Pittsburgh-Erie's experience is another example of the cost-saving benefits derived from using Latrobe's "Free-Machining" FM high alloy tool steels. These FM steels—high carbon-high chromium die steels with sulphide additives evenly distributed as a result of the "Desegatized" process—consistently result in improved machinability, better machined surfaces and production economy through savings in time, labor and tool life.

Results of Specially Conducted Test by Pittsburgh-Erie

Under the same production conditions, the performance of Latrobe's BR-4 FM die steel (with sulphide additives) was compared to that of a regular high carbon-high chromium die steel of similar analysis and hardness.

ROUGHING CUT

	OTHER STEEL	BR-4 FM
Speed	180 RPM	392 RPM
Feed	.014 in.	.024 in.
Depth of Cut	1/16 in.	1/16 in.

FINISHING CUT

Speed	180 RPM	392 RPM
Feed	.014 in.	.010 in.
Depth of Cut	.015 in.	.015 in.

DRILLING TIME

Hole Size 1/8" Plate Thickness 3/4" Hand Feed

BR-4 FM—23 seconds per plate per one hole.
Other Steel—45 seconds per plate per one hole.

Latrobe
STEEL COMPANY
LATROBE, PENNSYLVANIA

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LATROBE STEEL CO.,
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Please send me data on FM steels.

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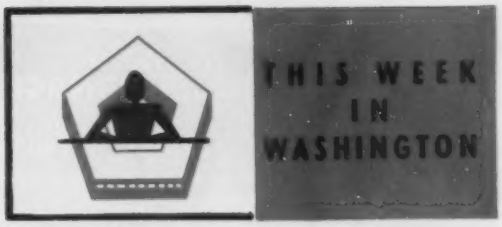
COMPANY.....

STREET.....

CITY..... STATE.....



Test Coming on Asian Buildup

Plan to aid Southeast Asia's economy will be presented to Congress in January . . . If program works, more capital investment in Asia by private U. S. corporations is expected . . . Europe may help—By G. H. Baker.

◆ CAPITAL INVESTMENT abroad by private corporations is going to be encouraged anew if the Eisenhower Administration's budding plan to foster the economic growth of Southeast Asia proves successful.

Success, the Administration notes, may take at least two forms. It can be measured by the degree to which the free nations of the Orient square away their financial and industrial positions, and by the firmness with which they reject attempts to lure them into the Communist bloc.

At the moment, the risks involved in placing private capital within countries at the southern rim of the Red perimeter make it an unattractive proposition for American businessmen.

Will Lessen Risk . . . These risks can be turned aside, federal officials believe, if the developmental program now being blueprinted is pursued systematically. The plan will meet its first critical test when President Eisenhower outlines his proposals to Congress, probably in January.

Western European nations will be urged to join with the U. S. in what originally will be an economic-aid phase, based on government funds and guided in part by recommendations from the Asians themselves.

When the Asians are sufficiently encouraged to begin contributing their own resources to the programs—as the Administration believes they will—a fair degree of political and economic stability should be achieved. This condition can be reached only gradually, however.

Subsequently, American firms with products to sell and technical services to offer are expected to find investment safe enough to lay out substantial money for Asian investments.

Dividends, in thriving nations with no oppressive fear of Red envelopment, can be extremely high. That, essentially, is the federal government forecast now.

Protect Production . . . Defense of production centers in the continental U. S. is to be the best that a very considerable amount of money will buy.

That's the tip from Defense Secretary Wilson. The head man at the Pentagon says there will be a bigger outlay for continental defense in the fiscal 1956 military expenditure of about $35 billion.

A variety of labels may be applied to the funds that will be used to provide maximum protection for the nation's target areas. Some of the money will go into the Defense Early Warning (DEW) line, some into interceptor aircraft, some into guided missiles.

Already planned is a heavier investment in missile development in the next fiscal year. Close-protection weapons such as missiles have their limitations, in the view of Air Force Secretary Talbott, who agrees that jet interceptors cannot be expected to handle defense alone, either.

If developed at the rate projected by the military, however, missiles will add measurably to the potential kill rate of defending units.

Prefabs Move In . . . Prefabricated housing may turn out to be the prime force in a gradual withdrawal of federal agencies from the low-cost housing field.

Producers of ready-to-assemble homes are completing a banner year. They believe final figures will show an output of not fewer than 75,000 units in 1954, and they foresee a rise to 85,000 or 90,000 in 1955.

One important Washington official who is certain that success of the industry will have an important impact on government housing activities is Federal Housing Chief Cole. He says:

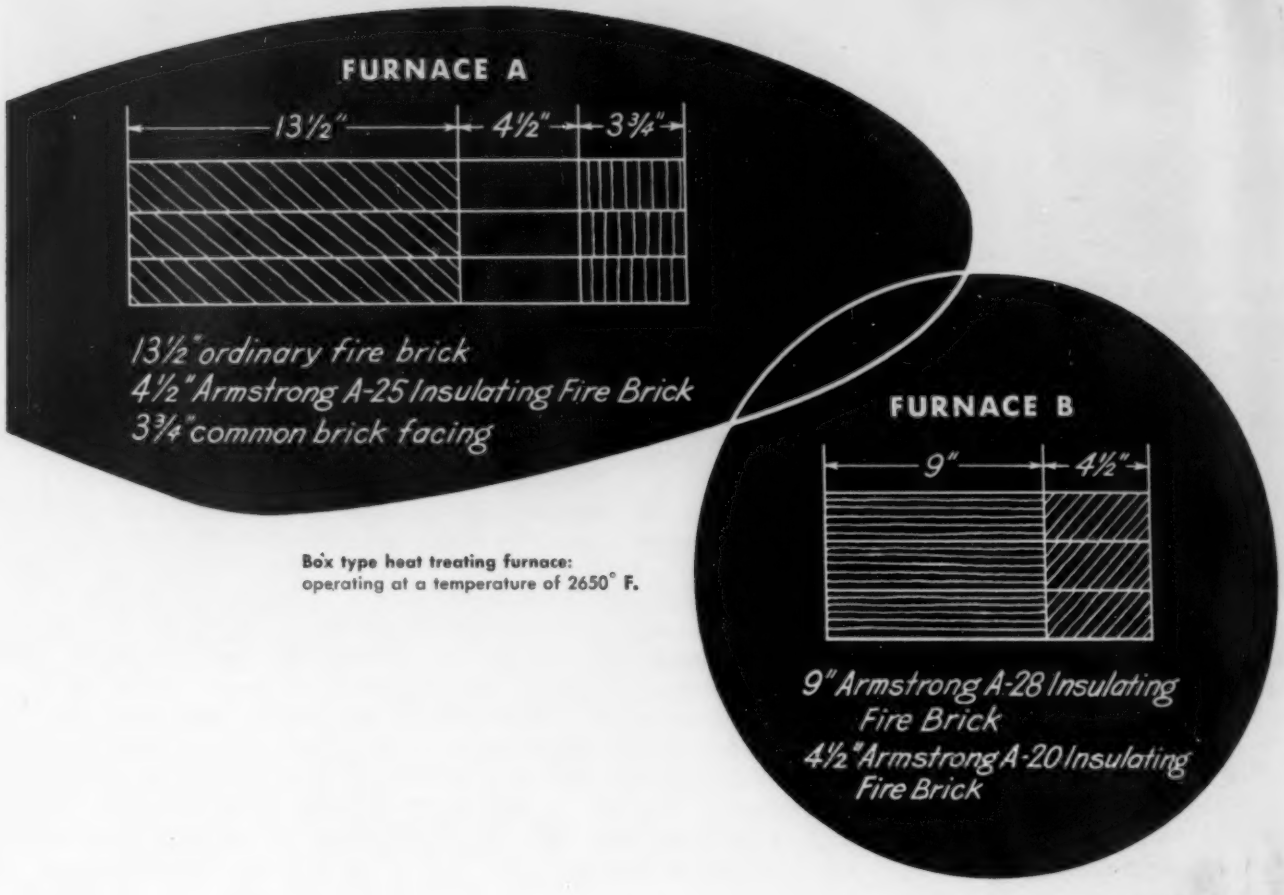
"The conquest of the lower cost housing market by private enterprise will make possible the pro-

Why Metals Fail

Results of several years of study of metal failures by the National Bureau of Standards are now available in a new phamphlet.

The pamphlet, "Mechanical Failures of Metals in Services," describes 35 cases of metal fatigue representing the most frequent types of failures in aircraft, automotive equipment and ships. Factors of design, fabrication or use contributing to the failures are also presented. Characteristics by which various types of fractures may be recognized are discussed and precautions to reduce mechanical failures are recommended.

Copies are available for 30¢ each from the Government Printing Office, Washington 25, D. C.



Box type heat treating furnace: operating at a temperature of 2650° F.

Which wall construction saves more fuel?

Improved operating efficiency and valuable fuel savings can often be achieved by a simple change in furnace wall construction.

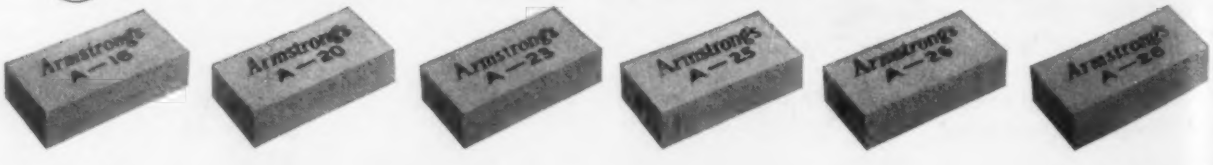
In these diagrams for example, the walls of furnace "A" were built of 13½" of ordinary fire brick, backed up with 4½" of Armstrong A-25 Insulating Fire Brick faced with 3¾" of common brick. The weight of this construction was 198 lbs. per square foot of wall area. Heat loss was 630 Btu's per square foot per hour, while heat storage amounted to 99,290 Btu's per square foot of wall area.

See how thermal efficiency improved with furnace "B's" construction. Here, 9" of Armstrong A-28 and 4½" of Armstrong A-20 Insulating Fire Brick were used in place of the bulky "A" construction. This change cut wall weight to 53.6 lbs. per square foot, and heat loss was reduced to 415 Btu's—a drop of 34% per square foot of wall area.

Most important of all, in an intermittently operated furnace, heat storage was reduced to 25,850 Btu's per square foot—a 74% drop. The increased efficiency of this more modern construction not only lowered fuel costs, but speeded up production by reducing time required for heating and cooling cycles.

The right furnace construction may help you cut operating costs and increase furnace capacity, too. It will pay you to call in an Armstrong engineer the next time you have a furnace lining or rebuilding job. His expert knowledge of refractories will help you get top operating efficiency from your furnace. For his help, call your nearest Armstrong office or write Armstrong Cork Company, 2712 Susquehanna Street, Lancaster, Pa.

Armstrong INSULATING REFRACTORIES



gressive withdrawal of the government from subsidy and special-support programs to serve this need."

Start **Executive Reserve** . . . Office of Defense Mobilization is beginning its executive reserve operations on a more modest scale than was predicted in the Capital.

A test group of business and labor executives who would be expected to handle defense production assignments in wartime has just been formed. This nucleus of a contemplated emergency force numbered only 33 in its initial session with ODM; in its present form it may not exceed 50 persons.

Men making up the test group are to be on call for full-time assignment to ODM or its successor agency in event of war. For the time being, they may be brought to Washington once or twice per year on a "trial run" basis.

After ODM has had an opportunity to study the merits of the current group, the agency may be ready to ask Congress for authority to set up a permanent executive pool, probably with not more than 300 members.

Business:

Manufacturers shipments up, though less than seasonally.

Manufacturers' shipments increased during October, although the rise was less than usual for the month, and new orders were in excess of shipments for the second successive month.

Latest figures from Commerce Dept. show that sales of all manufacturing firms in October rose $200 million above September to hit $24.6 billion. This was $2.2 billion below October, 1953. The rise from September to October, however, was caused by seasonal factors, and after adjustments, were down about 1 pct from the previous month.

New orders received by durable goods manufacturers in October exceeded deliveries by $300 million, increasing backlogs for the second successive month. After seasonal adjustment, however, new orders were off 2 pct from September. Inventory book value moved up slightly in October, largely because of new auto production.

Foundry:

GSA will sell $23 million Newcastle Foundry.

Government is going ahead with plans to sell its $23 million foundry at Newcastle, Pa., operated under lease for the last 13 years by United Engineering & Foundry Co.

Will Not Lease

Details of the sale are not yet complete, but the facility will be sold by competitive bidding. General Services Administration, the government agency which handles such facilities, turned down a bid by United to continue leasing and operating the plant. But it promised to give the firm an opportunity to bid whenever the sale is held.

A GSA spokesman says it is the government's policy to sell facilities whenever possible. The decision to sell the foundry came after several companies interested in buying the plant sent out feelers, he adds.

Won't Be Moved

The Newcastle Foundry will be sold under the National Security Act, which requires that a buyer keep it in condition to be taken over again by the government in any emergency.

"What's so unusual about that? Lots of people teach their dogs to beg."

Some 500 workers are employed at the plant, but a GSA spokesman points out that the government is unlikely to permit it to be moved, and it is probable that any buyer would have to continue operations at about present levels. Business and civic leaders at Newcastle are opposing the sale for fear operations might be discontinued.

United has been operating the plant on a year-to-year lease since it was built during World War II.

Employment:

Hiring rate up, slight drop in layoffs . . . Fewer strikes.

The number of work stoppages in October continued to decline from September and the summer months and an improvement also occurred in factory employment in the early fall.

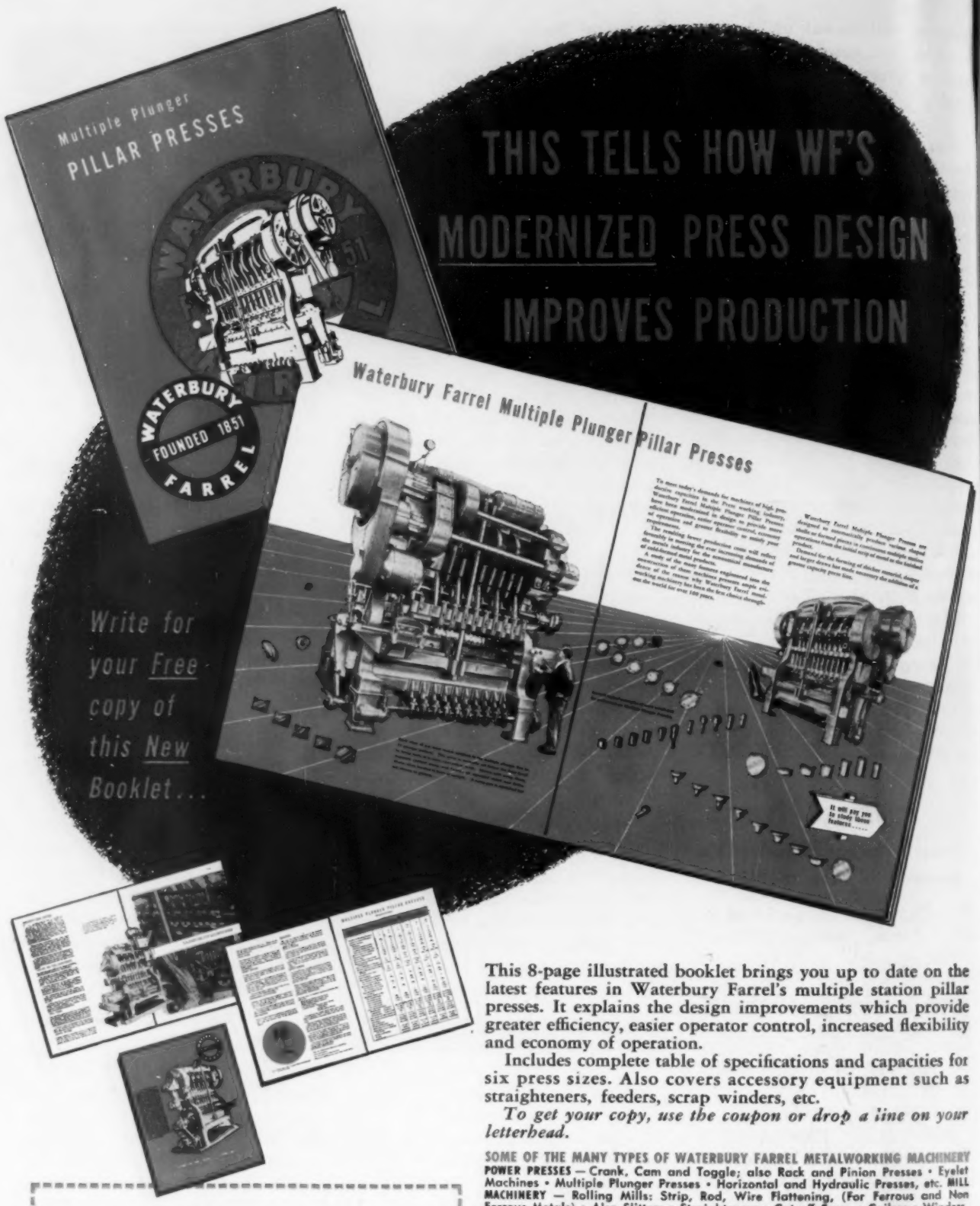
Fewer Work Stoppages

Labor Dept.'s Bureau of Labor Statistics reports that 300 new strikes involving 170,000 workers began in October, compared with 350 new stoppages involving 130,000 workers in September. The increase in the number of workers involved was due to large strikes of longshoremen and truckers in the New York-New Jersey area and a 10-day stoppage of construction workers in the south central states.

Auto Pickup Big Factor

The improved factory employment situation was attributed to a sharp upturn in auto hiring at a time when it usually declines. A slight drop in layoffs and a smaller-than-normal quit rate for the month helped improve the hiring picture. However, the factory hiring rate of 36 per 1000 in October was low compared with recent years and the layoff rate of 15 per 1000 was still above the postwar average for the month.

Increased hiring, as a result of the booming auto business, was also registered in transportation equipment and other metal and metal products industries.



This 8-page illustrated booklet brings you up to date on the latest features in Waterbury Farrel's multiple station pillar presses. It explains the design improvements which provide greater efficiency, easier operator control, increased flexibility and economy of operation.

Includes complete table of specifications and capacities for six press sizes. Also covers accessory equipment such as straighteners, feeders, scrap winders, etc.

To get your copy, use the coupon or drop a line on your letterhead.

SOME OF THE MANY TYPES OF WATERBURY FARREL METALWORKING MACHINERY

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Steel Warehouse Co-op Successful

Fabricators in Fresno, Calif., band together, buy carloads direct . . . Elimination of salesmen, profits saves members up to 30 pct . . . Boeing rebuilds tools "at home" for hefty savings—By R. R. Kay.

♦ COOPERATIVE steel buying is saving fabricators in the Fresno, Calif., area as much as 30 pct. Steel mills and warehouses have an eagle eye on this development, believed to be the first cooperative steel warehouse in the country.

That's what Andrew Yeram, manager and board chairman of the Cooperative Steel Supply Co., told THE IRON AGE in an exclusive interview.

Buy Direct . . . Here's how it works. The cooperative, a nonprofit corporation formed under California and federal laws, buys steel in carload lots direct from the mill.

A steel fabricator, on joining the co-op, puts up a cash deposit equal to one-quarter of his 1953 steel purchases; $1000 is the acceptable minimum. Members pay mill costs plus freight, size extras, and 10 pct operating expenses. They make greatest savings, 20-30 pct, on small orders.

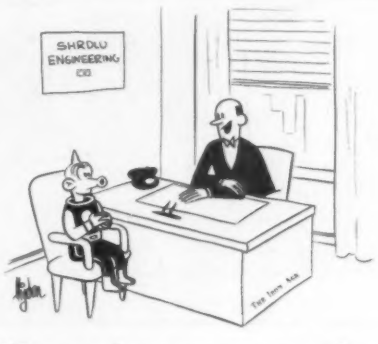
Needs No Salesmen . . . Since the co-op serves members only, it needs no salesmen. There's no collection problem. A member can't buy in one month more than his deposit covers. Bills are payable the 10th of the month or sooner if purchases hit the deposit limit before that date.

Co-op now has 15 members and claims quite a few more fabricators want to join. A maximum membership of 50 in 18 months is the goal. Co-op membership, present and potential, is diversified: makers of storage tanks, machinery for ranches, wineries, raisin growers and packers.

Seek More Capital . . . The manager figures that a 50-member organization would take a fair bite out of the gross business of established steel warehouses in the area. "We haven't complete coverage of steel yet," he says. "We need more members so we can get more capital to buy." So far, five carloads have been bought, from Oregon Steel Mills, Portland, but six or eight more are required. "We have to have plates, structurals, and pipe. We want to stock only the better-moving items."

Right now, Mr. Yeram, who owns a steel fabricating business near Fresno, is letting the co-op use his property at no charge. He draws manager's pay just for the time he actually puts in. He's been in the steel fabricating business some 15 years, admits the nonprofit cooperative buying plan hasn't generated any new friendships among steel warehousemen.

However, he's optimistic. The mills have been friendly, he says, and several of their representatives have been around. "All we need is more money to buy."



"We can always use a man with an eye to the future!"

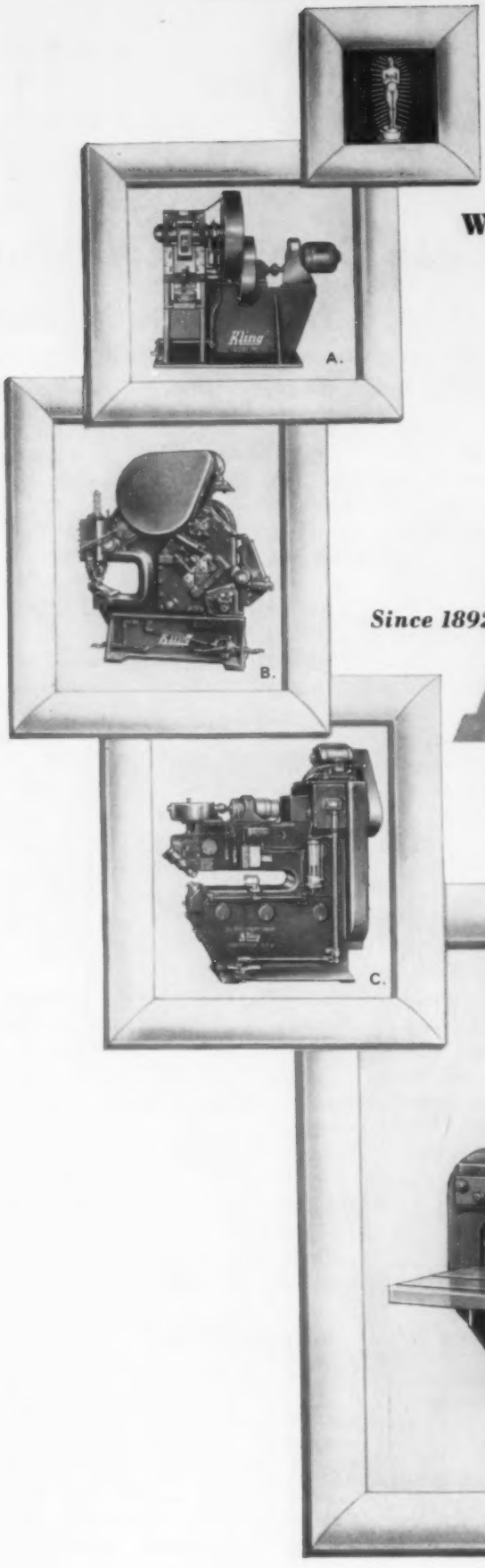
Rebuild Own Tools . . . Boeing Airplane Company's Seattle Div. reports that do-it-yourself pays off in machine-tool rebuilding. Until this year, most machines had to be sent out of the state for rebuilding, with resulting downtime of 3-4 months. By setting up its own department, Boeing cut a machine's off-the-job time to one month, and lowered the cost, too.

One example: a large mill that cost $4750 to rebuild outside the plant is done "at home" for only $3200. Also, there's the time saved.

The 30-man department during its first year rebuilt 280 machines, including lathes, grinders, milling, and boring machines. Rebuilding rate is now 13-15 units a month.

Shipping Increases . . . Shipping through West Coast ports worked up a good head of steam January through August. Market value of exports increased 18 pct over the same period last year—$884 million vs $751 million. Imports rose only $2 million to $626 million. Exports through San Francisco jumped from $233 million to $290 million and through Los Angeles, $183 million to $264 million.

Build New Plant . . . Automatic Sprinkler Pacific Co. began construction at Costa Mesa of its fifth California plant. The new $120,000 plant will start operations about Mar. 1, producing fire-prevention equipment . . . Radioplane Co., Van Nuys, Calif., is moving engineering and research activities on weapon systems into new quarters. A 28,000 sq ft office and laboratory building brings the firm's total area to 200,000 sq ft.



you too, can win a "PRODUCTION OSCAR"

with one of these versatile Kling Shears

All over the country, leading manufacturers are winning widespread recognition with new production records, cost-cutting achievements and other problem solutions by installing Kling metal working machines such as the various types of shears shown here. A number of plants are using the Kling Double Angle Shears (pictured below) to do two different jobs simultaneously. For example: cutting angles for steel fabrication on one side and steel bars on the other. These shears offer only a few examples of the wide range Kling has available for you as indicated in the table below. Write for bulletins on the models in which you are interested.

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Export Distributors: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.

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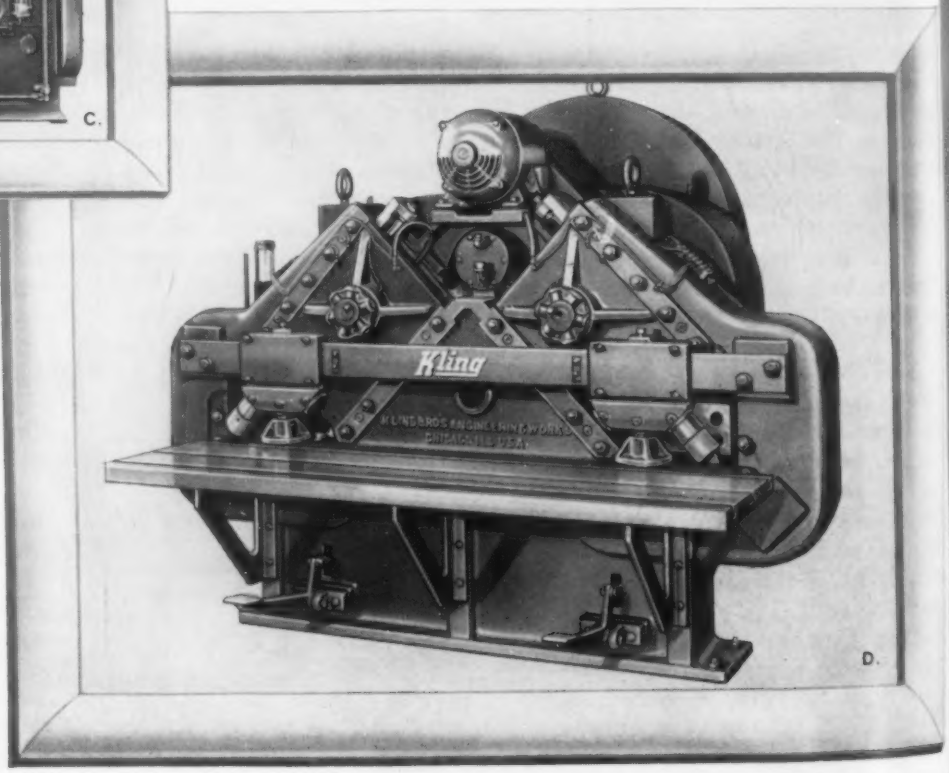


KLING'S COMPLETE LINES ASSURE SELECTION OF THE RIGHT MACHINE

A—GUILLOTINE SHEARS	4 SIZES	C—ROTARY SHEARS	7 MODELS
B—COMBINATION SHEAR, PUNCH & COPER	3 SIZES	D—DOUBLE ANGLE SHEARS	4 SIZES

737

MACHINE TOOL HIGH SPOTS

Builders Bucking Tough Market

Despite the new tax law, splurge of leasing plans, relaxed credit terms and painless financing, machine tool makers find selling is tough . . . Vance Plan delays haven't helped—*By E. J. Egan, Jr.*

◆ THE U. S. machine tool industry is still having sales troubles. New business has been up and down in a see-saw pattern for the past year. And there is no indicated trend toward a major improvement in the sales outlook. Actually, a continuing level of activity below the industry's production capacity might mean even more worker layoffs and shorter workweeks.

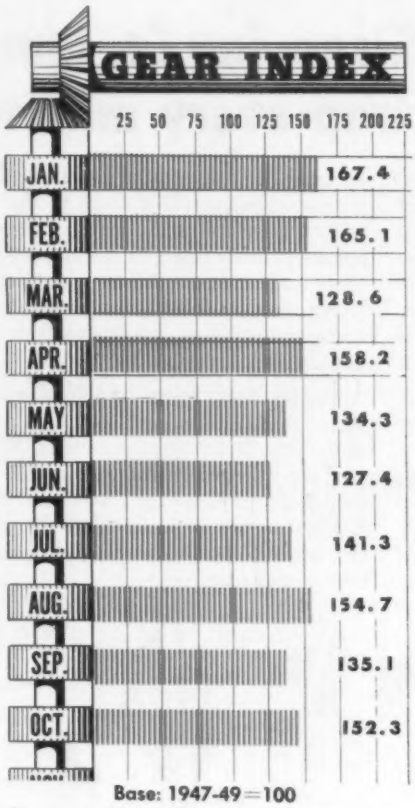
What happened to the bonanzas builders had been expecting? Early year forecasts predicted a mild boom due to (1) more realistic depreciation provisions in the new tax law, (2) a variety of lease and easy-payment purchase plans, (3) defense stockpiling.

Disappointing Reaction . . . The new tax law went through on schedule, but machine tool users haven't rushed to line up for new equipment. Builders suspect that many of their prospects might not even be aware of the faster write-offs they're now entitled to use. And where the awareness is present, the reaction has been disappointing.

Leasing plans, relaxed credit terms, and painless financing arrangements have boosted sales beyond what they might have been without these aids; but not to capacity levels. Builders have put a lot of time, effort and money into a program to convince prospects that they will have to get rid of obsolete equipment to keep up with their competition. They can only hope this message will eventually get across.

Washington Headache . . . In Washington machine tool builders face another problem. Defense planners announce periodically that the military services will soon spend $100 million for a variety of new machine tools. But so far not one order has been placed. Estimate from National Machine Tool Builders Assn's Cleveland headquarters is that Vance Plan spending won't start for another 6 to 8 weeks.

It all adds up to the fact that there is no rush to get new machine tools. A great many metalworking shops seem to think they are doing all right with the equipment they have. As for the Defense Dept., it's complex peacetime procurement methods automatically mean foot dragging.



Base: 1947-49=100
Source: American Gear Manufacturers Assn.

Hard to Convince . . . Underlying the tough selling job that builders face is an important fact of life: There is a segment of the metalworking industry that is not yet convinced that it means more money in the pocket to have the utmost in machine tool speed and accuracy.

Some metalworkers will argue that not all commercial products are assembled with jeweled-watch precision. They say that even many of the expensive, so-called prestige items have under-the-surface components that are no better than they have to be. And lower priced goods apply this economic principle to a still greater degree.

Even where extremely close machining tolerances are required, the quantity of pieces ordered is often small. It is difficult for the machine shop operator to see why new equipment would be any better than his old tools for short run work. He's busy, he's making a living, and he's hard to convince that he can make a better one with modern short-run tools.

British Expect Pickup . . . British machine tool builders have pulled out of a post-Korean business slump. And they're looking for continuing good business, due in part to one angle of the proposed West German rearmament program.

Theory among British builders is that West German machine tool firms will be kept busy (at least temporarily) with home orders once their army buildup starts.

Case No. 42

Kemp Immersion Heating Gets Top Results for Signode Steel Strapping Company

How Signode Steel Strapping Co. tempers 650 feet of steel strap every minute

At the Signode plant in Sparrows Point, Md., turning out up to a thousand miles of steel strap daily calls for fast, efficient production line techniques. One highly important phase in the final processing is the tempering bath. Here, Signode called on Kemp Engineers to supply the 15 ton, gas-operated Immersion Melting Pot shown above. Now steel strap is uniformly tempered at the rate of 650 feet per minute.

Kemp Offers More Advantages

By installing Kemp Immersion Heating, Signode benefits in many ways. Unlike underfired pots, Kemp pots are *not* subject to *periodic* and expensive shutdowns . . . won't crack or break. They operate *continuously* at maximum heating efficiency with a *substantial* savings in fuel costs. Offer a greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures. At the same time, this Kemp unit enables Signode to eliminate costly temperature override and open flame fire hazards.

Let Kemp Solve Your Problems

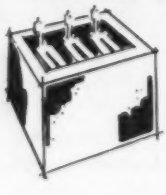
These same advantages apply to all types of melting or heating operations. Whether you are engaged in tempering, annealing, descaling, coating, etc., you can rely on Kemp Immersion Heating. Why not find out how Kemp Engineers can help you, save you money?

This 10 ton oval pot is typical of the many Kemp installations now in use. Features Kemp Carburetor, part of all Kemp equipment, to deliver complete combustion . . . without waste . . . without tinkering. One-pipe air and fuel feed reduces installation costs, simplifies maintenance.

For more complete facts and technical information, write for Bulletin IE 11 to: C. M. KEMP MFG.CO., 405 East Oliver St., Baltimore 2, Maryland.

KEMP OF BALTIMORE

IMMERSION MELTING POTS



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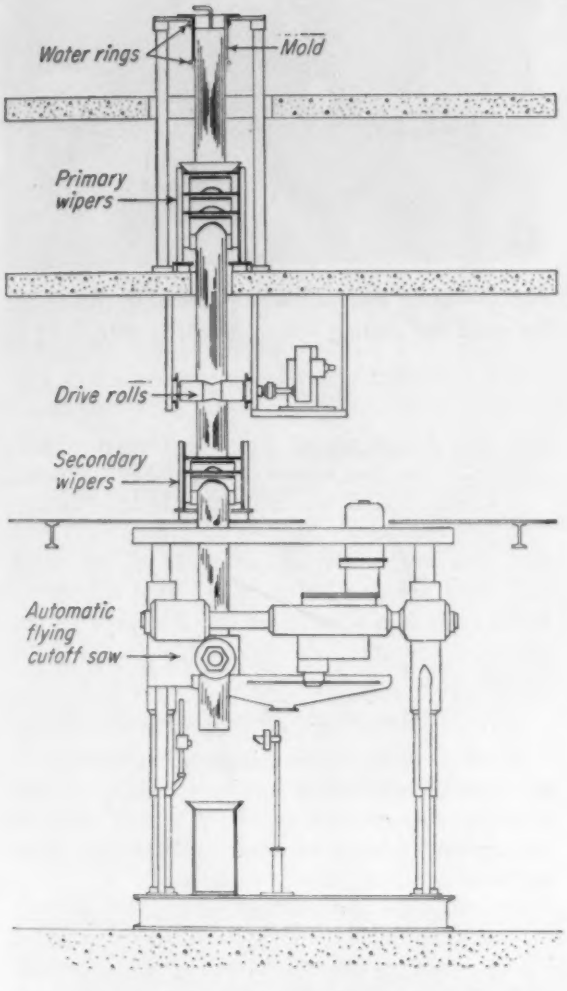


FIG. 1—Sketch of direct chill continuous casting machine at Dow's Midland, Mich., magnesium mill.

◆ Continuous casting of magnesium rounds and rolling ingots has proved highly successful at Dow Chemical Co.'s Midland, Mich., plant . . . Virgin magnesium ingot and process scrap are melted, refined, alloyed and then pumped to molds . . . Both molds and the cast are cooled by water sprays.

◆ Rounds from 6 to 18¾ in. in diam and rectangular ingots 11¼ x 42 in. are cast . . . A flying saw, actuated by an electric eye, cuts off the cast metal . . . Metal temperature, speed of withdrawal, volume and temperature of cooling water, and air pressure to pumps are continuously charted for close control . . . Automatic controls are used.

Rounds and rolling ingots—

Direct Chill Continuous Casting of Magnesium Proves Practical, Economical

By R. K. Paddock,
Assistant Superintendent, Alloy Plant
The Dow Chemical Company
Madison, Ill.

◆ DIRECT CHILL continuous casting of magnesium and its alloys has proved to be an economical and practical process. Used for more than 10 years in commercial production, The Dow Chemical Company of Midland, Mich., has found the process lends itself well to automatic control.

The direct chill continuous casting equipment now used at Dow is the result of continued experiment and development. The machines were first designed to accommodate a single cast. Later, changes in the roll design and saw clamping jaws permitted the simultaneous casting of two extrusion ingots 8 in. in diam or two rolling slabs not over 8 in. thick.

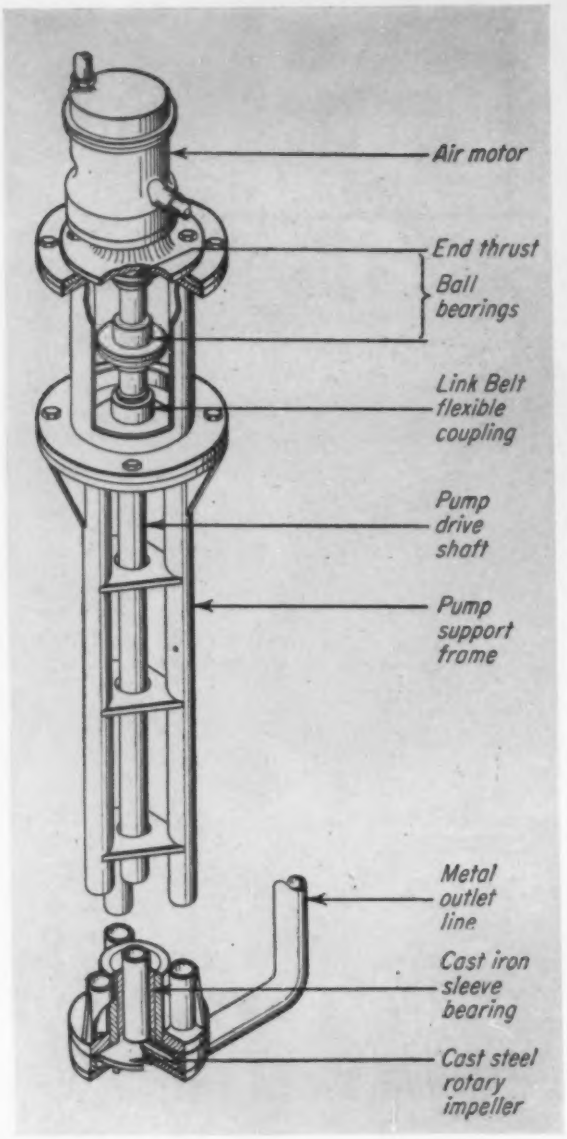


FIG. 2—Pump used for pumping molten magnesium from pot to pot and to the casting mold.

Fig. 1 is a cross-sectional sketch of one of the Dow direct chill continuous casting machines. Shown at the top is the end of the metal conveyor pipe through which the molten magnesium is pumped to the mold from a constant level source. Next is the sleeve mold and its support. Just under the flange and below the sleeve are two cooling rings from which the water is sprayed on the mold and cast. The ingot extends from the mold to the saw below.

Wiper rings supported in steel frame

The space between the operating floor and the ceiling of the saw room contains the first series of rubber wiper rings, supported in a steel frame, which remove the cooling water from the cast. A large flat pan catches the water from the wipers. The water is drained from the pan through an outlet in the bottom.

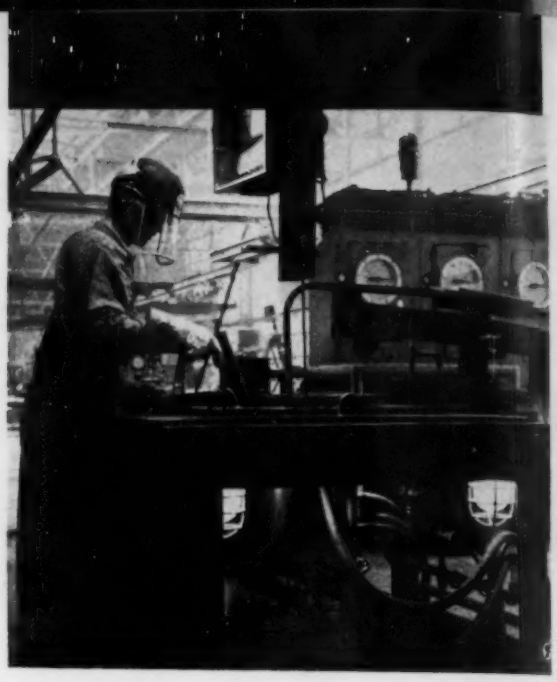


FIG. 3—Mold and supporting assembly. Rectangular mold for casting rolling ingots is 11¼ x 42 in.

Any accidental metal run out from the mold falls into the pan where it is quickly quenched.

A large suction fan connected to the chamber removes the steam formed by direct chill cooling. Farther below and attached to the chamber floor are the drive rolls. Just under the drive rolls is a second series of wipers to further dry the cast. At the bottom is the Loma cut-off saw.

Use virgin ingot, scrap in charge

Metal preparation consists of charging virgin magnesium ingot and process scrap into 4000 lb capacity cast steel pots. The metal is melted and heated to about 1400°F for alloying and refining prior to casting.

The molten metal is pumped from one pot to another and to the casting mold. Fig. 2 shows a detail sketch of one of these pumps. Air motors have proved to be most serviceable for this job. High temperatures and corrosive atmospheres over the pots have made the use of electric motors uneconomic. Good speed control is also possible with the air motor. Mild steel makes a satisfactory pump frame and transfer line material for pumping magnesium.

Copper plate used for sleeve mold

Fig. 3 is a view of the mold and supporting assembly. Production molds presently in use range in size from 6 in. to 18¾ in. rounds and rolling ingots of 11¼ x 42 in. rectangles. Other sizes and shapes within the physical limitations of the machines can be produced.

High purity copper plate is satisfactory for sleeve molds. Aluminum or magnesium can also be used. A steel flange supports the sleeve and cooling rings. The mold is suspended over an opening in the floor, roller guides keeping

A uniform film of cooling water flows downward over the exterior of the mold . . .

the cast in a fixed vertical position.

Molten metal at approximately 1300°F is pumped into the mold through an electrically heated pipe. A baffle plate directly under the inlet pipe directs the metal flow uniformly toward the mold wall where solidification begins. An SO_2 atmosphere above the metal in the mold prevents excessive surface oxidation.

Water is applied to the mold by one or more pipe rings with holes at ½ in. intervals. A uniform film of cooling water flows downward over the exterior of the mold.

About one inch below the mold is a second ring of the same design which directs the cooling water on to the emergent cast. This is in addition to that which flows from the mold. Accurate control of the volume and temperature of the cooling water is an important factor in obtaining the optimum metallurgical quality.

Cast solid when it emerges

Enough heat is removed through the mold wall so that a solidified shell is formed before the cast emerges. In addition, heat is also removed by the direct chill below the bottom of the mold. The cast is completely solid when it emerges.

Fig. 4 shows the roll drive assembly, spring containers and adjusting screws. The Loma cutoff saw making a cut is shown in Fig. 5. The sawing operation starts when the lower end of the cast interrupts the light beam to the electric eye. Length of ingot is varied by adjusting the light and eye positions up or down. Hydraulically operated jaws automatically clamp onto the cast above the saw blade.

When the pressure on the cast reaches 1200 lb gage, the saw motor starts and the saw travels toward the cast, moving down at the same rate as the cast.

Cutting speed is governed with a pressure control valve which can be set to higher or lower pressures as desired. After the cut is completed, a limit switch reverses the saw travel, returning the saw to its original position on the frame and shutting off the saw motor. Another limit switch releases the clamps and the saw frame returns to its repose position. Test slices are cut with a special control on the operating board panel.

Ingots marked and stored

After ingots are cut off they are marked with the batch and piece numbers to correspond with samples taken during casting. After this the ingots are stored for further processing.

Recording ammeters at the operator's station chart the number of saw cuts. The chart also records the time that each cut is made so that the aking of analytical samples can be properly synchronized. It also serves as a warning to the operator when the saw blade should be changed.

Metal temperatures, speed of withdrawal, cooling water volume and temperature, and air pressure to the pumps are charted continuously and form the basis for the control program.

Development of the direct chill continuous casting machine is based on 14 years of research and experimentation. The success of this machine is largely due to this research and early operating experience.

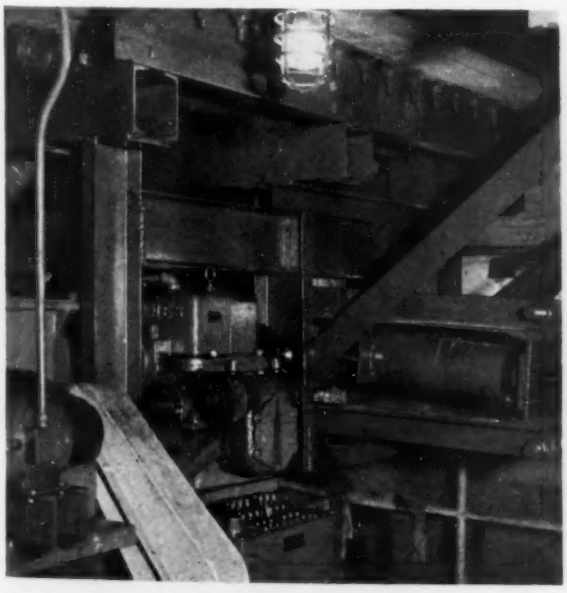


FIG. 4—Side view of roll drive assembly showing spring containers and adjusting screws.

FIG. 5—Flying cutoff saw cutting through magnesium. Electric eye actuates saw.

Job shop operation—

Shot Peening SAVES WEIGHT, IMPROVES FATIGUE LIFE on Low Volume Parts

By W. G. PATTON, Asst. Technical Editor

◆ Shot peening has become more than a mass production tool . . . Many low volume aircraft parts are now being shot peened to improve fatigue life and save weight . . . These include springs, landing gear trunnions, gears and miscellaneous forgings.

◆ Apart from increasing fatigue life shot peening is also used to form or straighten parts such as ring gears, shafts and extrusions . . . By selectively applying the correct peening intensity, many parts can be salvaged in this manner.

◆ EXTENSIVE RESEARCH has firmly established the beneficial advantages of shot peening as a means of increasing fatigue life and simultaneously saving weight in many highly stressed automotive, aircraft and locomotive parts. Shot peening has been used successfully to increase substantially the endurance limit of critical production gears. Automotive spring life has been increased as a result of shot peening. Weight savings of as much as 2 lb per car has been credited directly to the beneficial results of shot peening.

While mass production applications of shot peening have been increasing steadily, shot peening has also been employed successfully to improve the service performance of critical parts used in smaller quantities such as in the aircraft and oil tool industries.

A shot peening job shop, Metal Improvement Co., established in Los Angeles in 1946, has been able to meet the requirements of a broad range of industries, including for example, small, critical parts for hot rod cars and the forming of entire sections of airplane wings. The company will soon open a New York branch, also to handle low volume applications. . . . Among a growing list of critical aircraft parts that are being shot peened to improve their service life are landing gear parts, exhaust stacks, machined and extruded aluminum sections, arresting hooks, hydraulic cylinders and pistons.

INTEGRALLY stiffened skin being lifted from the peen forming fixture at the Los Angeles plant.

Apart from increasing fatigue life, shot peening has also been used to form or straighten parts such as ring gears, shafts, extrusions, etc. This can only be accomplished if the cross section is fairly thin in relation to the whole part. By selectively applying the correct peening intensity, many parts can be salvaged in this manner, and have a beneficial residual compressive stress on the surface.

Metal Improvement Co. has interested a variety of industries in the facilities it has developed as well as the ingenuity of its methods. Much of its equipment has been designed and built by its own personnel. As a result of its unique experience, the company is able to take new aircraft designs, for example, build special equipment to do the job and handle the limited volume of parts currently being produced within the economic limitations imposed. In addition to developing its own equipment, Metal Improvement Co. has helped to develop several new techniques for forming and straightening that have been unusually successful.

Undoubtedly the most publicized application of shot peening by the Metal Improvement Co. is its use to peen form airplane wings. Nearly 4 years ago, Lockheed Aircraft Corp. started a program of machining integrally stiffened wing panels. The new designs replaced conventional spar and riveted wing construction. A typical panel is machined from a slab of 75 ST 6 aluminum, 1¾ in. thick, 32 ft long and 4 ft wide. Approximately 91 pct of the material is removed by machining.

It is interesting to note that conventional forming methods could not be used for this application. Cold forming would not produce the necessary air foil curvature, since residual tensile stresses on the surface could not be tolerated. Hot forming was impractical. Shot

INCREASED FATIGUE LIFE has been achieved by shot peening aircraft parts such as the nose wheel yoke shown at the left, exhaust stack, center, and landing gear collar, right.

peening was found to be the only method that would produce the desired curvature and simultaneously eliminate undesirable distortion resulting from machining.

A special machine, 75 ft long was built to handle the job. Horizontal rubber rolls feed the panel through the cabinet which has 6 oscillating nozzles. Rate of feed can be adjusted, ranging from 2 to 20 in. per min. Each nozzle is adjustable to provide air pressure from 0 to 90 psi. Flexibility is essential since the curvature requirement of the wings varies from 0.055 in. to 0.500 in.

Several thousand wing panels, including a number of different designs, have been handled by this equipment. A larger cabinet, capable of handling stiffened wing panels up to 10 ft wide has recently been built. The new cabinet will feed wing panels vertically rather than horizontally. This method reduces shot loss and also conserves floor space.

At its Los Angeles plant, 11 different shot peening cabinets are kept in regular daily operation. Each cabinet is designed to handle a variety of jobs with minimum delay for set-up.

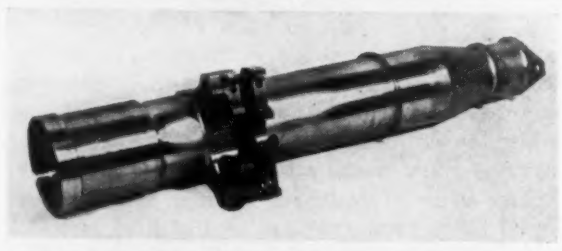
Typical aircraft parts now being shot peened are shown in the accompanying illustrations. The landing gear parts shown were heat treated to 260,000 to 280,000 psi. (Rc 51 to 54.)

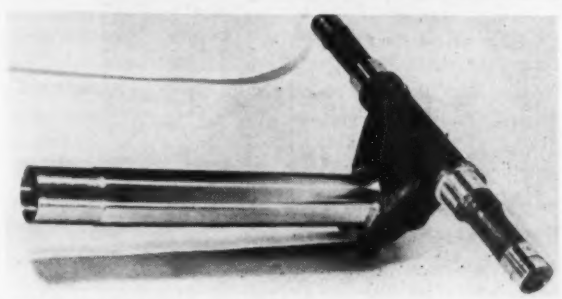
Aircraft practice in the use of shot peening reflects the advantages gained from this type of treatment. A leading aircraft producer, for example, requires shot peening on this high strength, heat treated material under the following circumstances:

1. Wherever there is high stress concentration.
2. On a highly stressed area which has been ground.
3. On any area that is to be chromium plated.
4. On any area that has been straightened.
5. On any area that is not machined after heat treatment.

Almen strips are employed to control the intensity of the peening operation. Both heavy and light section parts are being peened successfully.

While it is recognized that shot peening is still not an exact science, service reports indicate that peened parts are successfully resisting fatigue failures in service. The use of shot peening by the aircraft industry has undoubtedly stimulated inquiries by other industries, including marine, railroad, machine tool, tractors and earth moving equipment.





RING GEAR, top, landing gear cylinder, center, and landing gear trunnion, bottom, are typical of many aircraft parts which are shot peened.

Tempering and coating—

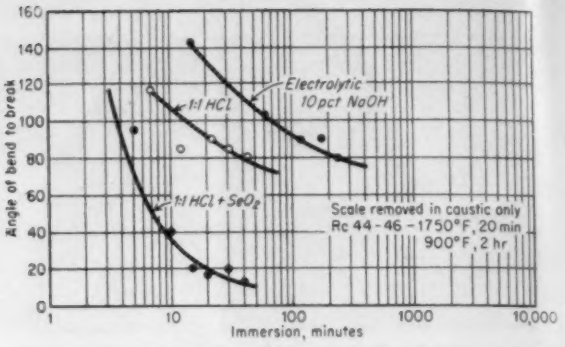


FIG. 1—Embrittling powers of several solutions (both acid and caustic) at varying times of immersion on samples of 12 Cr steel were studied.

How to Control Hydrogen Embrittlement In 12 Chrome Steels

◆ Improved control of hardness and protection from corrosion can help reduce or eliminate premature cracking failures in 12 chromium steels which result from hydrogen embrittlement . . . The harder the material, the more susceptible it is to hydrogen embrittlement the studies indicated.

◆ Materials tempered in the 1000°F range show less susceptibility than those tempered in a lower range . . . Organic protective coatings help by preventing corrosion, leaving no hydrogen available to diffuse into the metal . . . Elongation is influenced by hydrogen embrittlement.

By A. E. DURKIN, Thomson Laboratory
General Electric Co., West Lynn, Mass.

◆ HYDROGEN embrittlement, a source of premature cracking failure in 12 chromium steels, can be reduced or eliminated through the use of proper tempering times and temperatures and use of suitable organic protective coatings.

Cracks resulting from hydrogen embrittlement in these materials are similar to those found in the season cracking of zinc base alloys.[1] Hydrogen may also cause failure in the steel by lowering its ductility or finally reducing its fatigue characteristics to abnormally low values. Field failures of 12 Cr steels by these methods are usually due to surface corrosion. Hydrogen released in the corrosion process diffuses into the metal to cause failure under certain conditions.

To determine the susceptibility of 12 chrome steels to hydrogen under various conditions, laboratory tests were set up in which the hydrogen to produce failures was obtained from caustic soda and hydrochloric acid solutions. The electrolytic caustic solution would produce known quantities of gas without attacking the metal while the acid solutions would show the effect of hydrogen and metal attack and acid impurities.

The effect of hydrogen on steel can be measured by observing its loss in ductility. Zapffe[2, 3] in his work on hydrogen embrittlement in metals has shown that ductility measurements are reproducible in determining the extent of embrittlement. A constant rate bend machine similar to the one used by Zapffe was used here to measure the effect of hydrogen on the steel under different heat treating conditions.

To determine the effect of various media in producing embrittlement, samples of the steel in the Rc 44-46 hardness range were subject to both caustic and acid solutions. Results of these tests are shown in Fig. 1. Ductility decreases considerably in both solutions. The acid solutions are more severe than the caustic soda solution. The acid attacks the metal and causes stress risers,

EDITOR'S NOTE—Mr. Durkin is now associated with American Metal Processing, Wakefield, Mass.

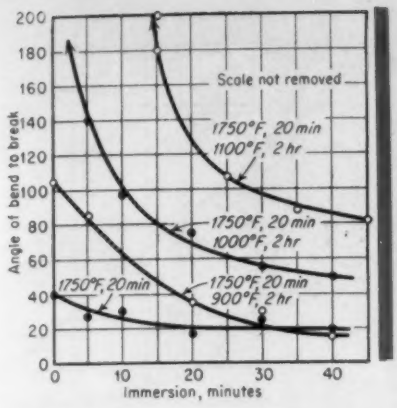


FIG. 2—Angle of bend decreases as processing time increases when 12 Cr annealed steel is subjected to a 1:1 solution of HCl + SeO_2.

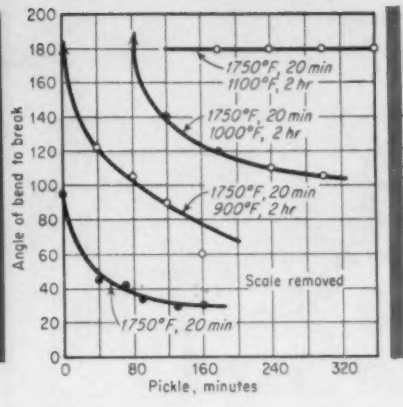


FIG. 3—In 10 pct caustic soda, annealed 12 Cr steel showed failure pattern noted in acid but processing time was longer.

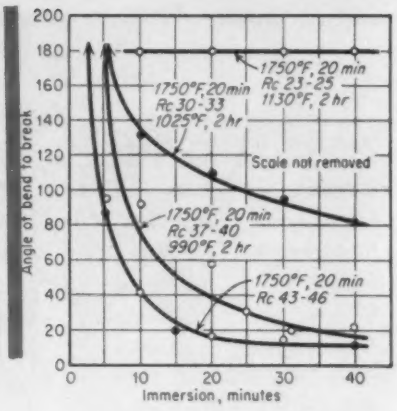


FIG. 4—In lower hardness range samples of 12 Cr steel pickled in 1:1 HCl + SeO_2 acid were less susceptible to embrittlement.

while the caustic does not affect the steel but only releases hydrogen to it.

A comparison of the ductility loss in caustic and hydrochloride acid solutions shows that the lowest ductility in a 40 minute acid immersion is approximately 80° while in the caustic solution, it is approximately 113°. It would appear that the acid and caustic curves would level out in the 70° range if metal attack were not a consideration in the former solution.

The position of the acid selenium curve in which the ductility has decreased in a 50 minute period from 118° to 10° is as expected. Metals such as selenium are known to promote embrittlement. It is evident, however, that under the conditions described hydrogen from either acid or caustic solutions has a very decided effect on the ductility of the steel.

To determine under what factory heat treat conditions 12 Cr was susceptible to hydrogen, tests were run in which specimens were tempered between 900° and 1130°F. Samples were pickled in the acid selenium solution to determine the exact effect of the most severe of the pickling media. The samples were treated for the times indicated, between 5 and 45 minutes, and subjected to angle-of-bend-to-break tests to determine the effect of the solutions on the ductility. Test results are shown in Fig. 2.

As processing time increases, the angle of bend decreases in every case. The higher the tempering temperature the less the reduction in ductility. At the 1100°F temper, the bend angle has decreased from 180° to 82° while the 900°F tempered samples have decreased to 20° bend. After extended immersion periods, the 900°F tempered and no temper curves level off indicating the acid attack is a factor in this long period.

No breaks occurred in bend test

The arrows on the curves show that no breaks occurred in a 180° bend test. This confirms Zapffe's work in which he shows a hydrogen incubation period on the steel prior to the actual embrittlement. These areas will be noted in the subsequent curves and vary with the conditions of treatment. The less susceptible to embrittlement, the longer the incubation period.

To determine the effect of the hydrogen without any concurrent metal attack, the tests shown in the previous curve were repeated but the hydrogen in this case was supplied from an electro-

Overcoming Hydrogen Embrittlement

The harder the material the more susceptible it is to hydrogen embrittlement. Material in the hardness range of RC 43 to 46 is extremely susceptible, while material in the range of RC 23 to 25 shows no susceptibility within the limits of the test machine.

Acid atmospheres cause premature failures of 12 Cr steels under certain conditions by a combination of pitting, loss of cross-section, intergranular attack and hydrogen embrittlement. Some impurities in the acids accelerate the tendency to embrittle. Acids containing sulphides have been found to act in the same manner.

Tensile strength of 12 Cr is apparently not reduced by hydrogen embrittlement, but elongation *is* influenced.

Materials tempered in the 1000°F range show less susceptibility than those tempered in the lower ranges.

Embrittlement, or susceptibility to hydrogen embrittlement, can be reduced or eliminated by using the proper tempering time and temp. with the 1750°F solution temperature, i.e., 1100°F range.

Protect the steel with an organic top coat to prevent surface corrosion, leaving no hydrogen available to diffuse into the metal. Where sand abrasion is a problem, a rubber coating will prevent corrosion. A vinyl coating will be effective in acid conditions. A phenolic or epon type coating is satisfactory where humidity and salt spray corrosion is the problem.

Analysis of 12 CR Steels	
Carbon	0.06—0.13
Chromium	11.50—13.00
Manganese	0.25—0.80
Nickel	0.50 max
Silicon	0.50 max
Molybdenum	0.20 max
Phosphorus	0.03 max
Sulphur	0.03 max
Aluminum	0.05 max
Tin	0.05 max

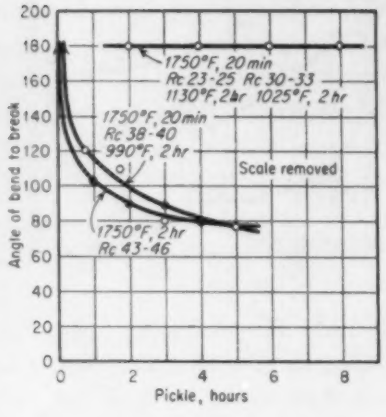


FIG.5—At lower hardness ranges, samples of 12 Cr steel pickled in caustic soda also showed less susceptibility to embrittlement.

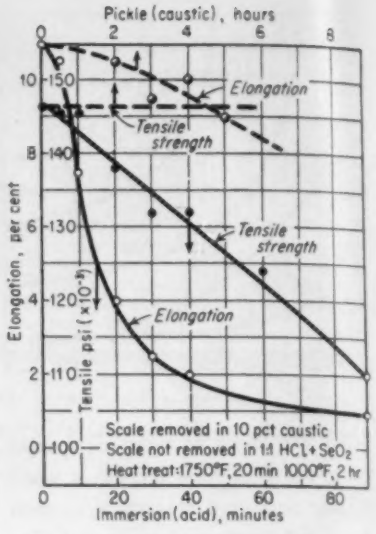


FIG. 6—Both ductility and tensile strength of 12 Cr steel samples fell off after treatment in acid and caustic solutions.

lytic caustic soda colution. The results of these tests on the various tempering conditions are shown in Fig. 3.

The same general pattern of failure is had here as was had with the acid solution. Processing times, however, are considerably longer. Here the test has been run for 320 minutes while in the former solution, it was run for only 60 minutes. Also, the 1100°F temper has shown no embrittling tendencies up to 180°, the limit of the test. The no temper up to the 1000°F temper shows varying degrees of effect ranging from 30° of bend to approximately 105°. The higher the temper, the less the effect.

These data were obtained from factory heat treatments and factory stock. To determine the exact effect of the solutions on specific hardnesses, tests were conducted in which the hardnesses were measured. Samples were subjected to the solutions as above. Test results are shown in Figs. 4 and 5.

Here again, in the caustic solution, the angle of bend values are considerably higher than in the acid solutions. Also, stock in Rc 30 to 33, is unaffected at 180° of bend in the caustic while in the same hardness range in the acid, specimens have decreased in bend angle to 80° at the end of 40 minutes.

In the case of the Rc 23-25 samples, there was no break in either the caustic or acid solutions for the length of the test time. Note in Fig. 4 that the angle of bend to break in the no temper samples has decreased to about 20° showing the full effect of the acid attack on the hardened samples.

Curves showing the effect of caustic on the Rc 38-46 samples tend to follow along with each other as is seen in Fig. 5. The higher the tempering temperatures and the softer the steel, the less susceptible is the steel to embrittlement in either acid or caustic solutions.

To determine the effect of the hydrogen on tensile strengths and elongation, additional samples were processed in both acid and caustic soda solutions for periods up to 6 hours, in one case, and 90 minutes in another. Tensile strengths and elongation values are plotted in Fig. 6.

In the acid solution, there is a decrease in both ductility and tensile strength as the time of immersion increases. The tensile strength decreased from 144,000 psi to 110,000 psi in an 80 minute immersion. Elongation of the steel was reduced from 11 pct to approximately 1 pct. In the caustic solution embrittlement media, a slight decrease in elongation after 6 hours was noted. Tensile strength, however, remained the same throughout the immersion period.

To determine the effect of hydrogen on the endurance characteristics of 12 Cr steels, 12 samples were vibrated at a stress level of 55,000 psi. The unembrittled steel failed in 0.96 hours while the embrittled samples averaged only 0.14 hours before failure, indicating hydrogen had a serious effect on fatigue characteristics.

REFERENCES

1. A. E. Durkin, "Hydrogen Causes Embrittlement of Forged Compressor Blades," Steel, Mar. 1952

2. C. A. Zapffe and M. E. Haslem, "Electroplating and Cathodic Pickling as Causes of Hydrogen Embrittlement," Wire and Wire Products, May 1947

3. C. A. Zapffe and M. E. Haslem, "Sensitivity of Different Steels to Pickling Brittleness," Wire and Wire Products, July 1948

ACKNOWLEDGMENT

The writer wishes to thank C. W. Irish and R. J. Sommers of the Chemical and Metallurgical Program and D. Preston of the Thomson Laboratory for their assistance in this work.

Hoppers and abrasive belts—

Modern Centerless Grinding Speeds Output of Precision Parts

◆ Automatic loading hoppers and power-driven conveyors can cut centerless grinding costs . . . Used with batteries of grinders, loading and transfer devices boost production and simplify machine sizing and resetting . . . Excellent hoppers are available for through-feeding or in-feeding.

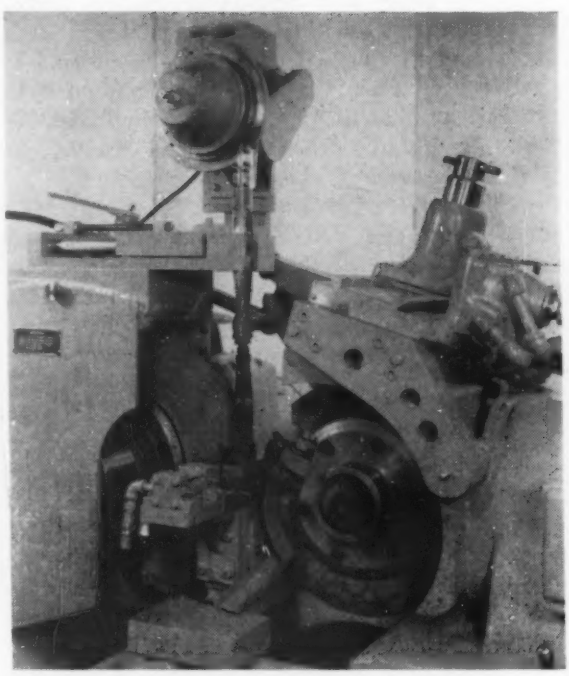
Part III

By J. E. HYLER, Consultant
John E. Hyler & Associates, Peoria, Ill.

◆ AUTOMATIC hoppers can be important cost reduction factors in centerless grinding smaller parts, both by the through-feed and in-feed method. One versatile automatic hopper will accommodate many types and sizes of through-feed work such as piston pins, small shafts, bushings and similar parts. Minimum part length the hopper will handle is twice the part diameter, while maximum part length is 18 in.

Another hopper, designed for in-feed grinding, will handle headed work up to 8 in. long under the head, such as studs, chain pins, valve tappets, etc.

Centerless grinders are often set up in batteries, with power-driven conveyors passing the work from machine to machine. These installations greatly simplify sizing adjustments and resetting. A standard hopper may be used to load work automatically in the first machine, after which the motor-driven conveyors may take over.



RIVETS are automatically loaded, centerless ground and ejected in this rapid cycle setup.

MR. HYLER has contributed numerous technical articles to The Iron Age. His background knowledge of metalworking machinery and methods is based on more than 20 years of practical shop experience. This article concludes a 3-part Series. Parts I and II appeared in The Iron Age for Nov. 25 and Dec. 2.

Greater precision, higher output have been achieved in improved grinding units . . .

Work leaving one machine is automatically dropped on the conveyor by means of a counterweighted escape device. Since each unit can be individually adjusted without affecting any of the others, it is unnecessary to maintain a straight line of work passage.

The type of conveyor setup is used in grinding rocker-arm shafts for the automotive industry, where stock removal is 0.015 in. and required finish is 10 microinches. Five centerless grinders in this production line produce 170 finished shafts per 48-minute work hour. A hopper feeds the first machine, after which parts are conveyed through the other grinders, finally emerging from a centerless lapping machine.

Correct wheels help reduce chatter

Centerless grinders of abrasive-belt type are relatively new, and prove suitable for various types of work. Usually the abrasive wheel is replaced by a contact wheel, around which runs an abrasive belt. As a rule contact wheels of different degrees of hardness are interchangeable. Correct wheel hardness has much to do with elimination of chatter.

Regulating wheels on some belt-type machines have feed angle adjustments ranging from zero feed for plunge grinding, to 35 fpm for through-feed work. Some of these machines dress their regulating wheels by running a special 4½ in.-wide belt over an accurate truing wheel to generate the correct hyperboloid form.

Certain heavy duty belt-type centerless grinders use abrasive belts instead of regulating wheels as feeding members. One advantage claimed is that the belt maintains continuous contact with the work at all feeding angles. This eliminates the need for dressing when either the size of the work or the angle is changed.

Centerless type polishing machines use belts for feeding and polishing both straight and tapered work on the through-feed principle. The housing for the feed belt and its pulleys can be swivel-tilted to change the rate of feed. The housing can be set for forward, neutral or reverse operation. An indicator plate and a pointer permit duplication of feed rates at all times. Material being polished is supported on the customary work rest, which is automatically located as the machine is adjusted for different diameters.

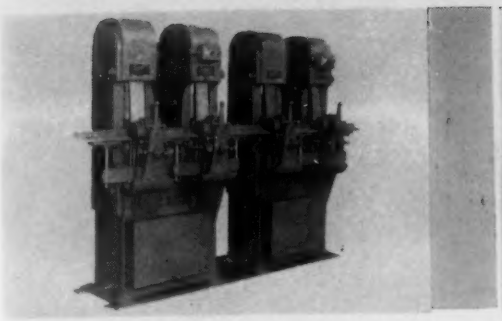
The feed belt on these machines encounters the work with an upward travel motion, but the abrasive belt travels downward to contact the work. The abrasive belt is a leather-cushion type with a herringbone face to provide high points for cutting and low points for clearance. Where tapered work is processed a special taper feed attachment must be used. This device uses a rubber roll which can be tilted to vary the feed in lineal feet per minute. The attachment also uses a ball bearing slide which allows the feed roll to follow the work taper automatically.

One versatile belt-type centerless unit can be used for general purpose finishing and polishing at either a standard or a high speed rate. It is basically of the idler backstand type with the abrasive belt running over a contact wheel. Abrasive belt processing can be supplemented with the use of various buffs, wheels and brushes.

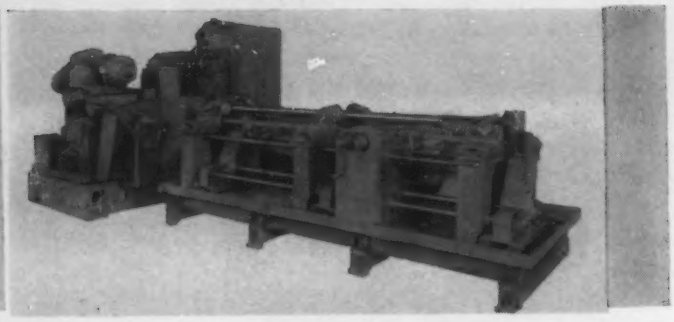
These accessories are used where surface specifications call for low microinch finishes, high plating lusters or satin finishes. Where these machines are installed in tandem, adjustable roller fixtures carry workpieces between the units. First machines in the line may be equipped with idler backstands and abrasive belts, while finishing units complete the work with buffs, wheels, or brushes.

Variable speed feed drive units control work rotation on these idler backstand machines. By angular setting of the feed box, the drive units determine traverse feed in lineal feet per minute. Taper feed attachments can also be used. Special idler roll supporting fixtures are available for processing long bars, rods, tubes, etc. Where necessary, special heavy duty power driven fixtures may be used to support long heavy work and rotate it at any desired speed.

CENTERLESS belt grinder with feed chute processes 2000 fountain pen barrels per hour.



DUPLEX centerless belt units in tandem automatically apply a progressively finer finish.



HEAVY duty belt type machine has a support and feeding fixture for long bars and tubes.

Another type of centerless finishing and polishing machine uses an abrasive belt which runs vertically, one pulley being located above the other. This unit produces a variety of finishes by using abrasive, felt, leather or fabric belts. It has a so-called platen roll over which the abrasive belt runs on one side. The platen roll functions in somewhat the same manner as the contact pulley on a backstand idler.

Working with this platen pulley is a feed roll which operates in place of the regulating wheel on the usual centerless grinder. A work rest blade supports the work on its way through the machine. These machines are made in single and duplex models. The duplex simply carries two parallel belts at some distance apart although the belt mechanisms are supported by the same machine base.

Vertical belt machines will handle straight or tapered cylindrical work up to 1½ in. in diameter provided the weight is limited. Work may be fed either manually or by hoppers or other automatic devices.

The roll platen is usually of ball bearing type covered with rubber, especially when used for stock removal on small diameter work. However, a ball bearing, twin roll steel platen can be used instead with the two rolls having parallel axes. This arrangement is used for polishing to a soft-buff-type finish rather than for stock removal.

Belts permit heavy stock removal

These duplex machines are used successfully to polish glass tubes, such as medical syringes, after they have been centerless ground. Where specifications call for absolute transparency, felt belts and rouges have been replaced by a newly developed cork-coated belt. A flow of water is maintained over the belt and work area. In-feeding carries the work to a stop where the tubes are manually removed. Cycle time is 5 seconds per piece. The tubes have an absolutely transparent finish and are within allowable tolerance limits.

Other belt type centerless grinding and finishing machines are capable of heavy stock removal on bars and tubes from 1 to 6 in. in diameter. With proper fixtures, the workpiece may be of any length and weight. On these machines an abrasive belt runs over two idler pulleys and is backed up at the point of contact by a heavy steel wheel.

With a proper cutting lubricant these machines are said to offer stock removal rates not possible with conventional grinding wheels. Other claims are that the abrasive belts are less expensive per pound of metal removed, and that they may be changed in a matter of minutes.

One abrasive regulating belt is designed to be backed up by a rigid steel platen. This gives the belt continuous contact with the workpiece across its entire width, regardless of the feeding angle. The feed unit angle can be adjusted for a wide range of traverse rates up to 40 fpm in either direction. This design eliminates the wheel-dressing operation which is usually required when a setup is changed on a machine using a regulating wheel. And since the workpiece can be reversed in its travel, multiple pass grinding can be done without removing work from the machine.

Idler pulleys used with this belt design are arranged so that center distance between the two may be increased or decreased. This adjustment compensates for any stretching variation in belt length. The mechanism is hydraulically operated and electrically controlled to assure constant and uniform belt tension for increased life. During traverse the workpiece is conventionally supported by a work rest between the abrasive cutting belt and the abrasive regulating belt.

These special centerless abrasive belt machines were developed largely for heavy stock removal on extruded tubing. They remove material quickly, clean up all extrusion marks, and provide a proper finish.

In abrasive belt grinding practice a small amount of taper is frequently set up between the face of the abrasive regulating belt and the contact wheel face. This provides uniform stock removal across the width of the grinding belt.

Modern abrasive belt centerless grinders are capable of grinding all types of material provided the proper belt is run at the correct speed. In addition to metal and glass, these machines are also used to finish plastic parts, and even paper tubes.

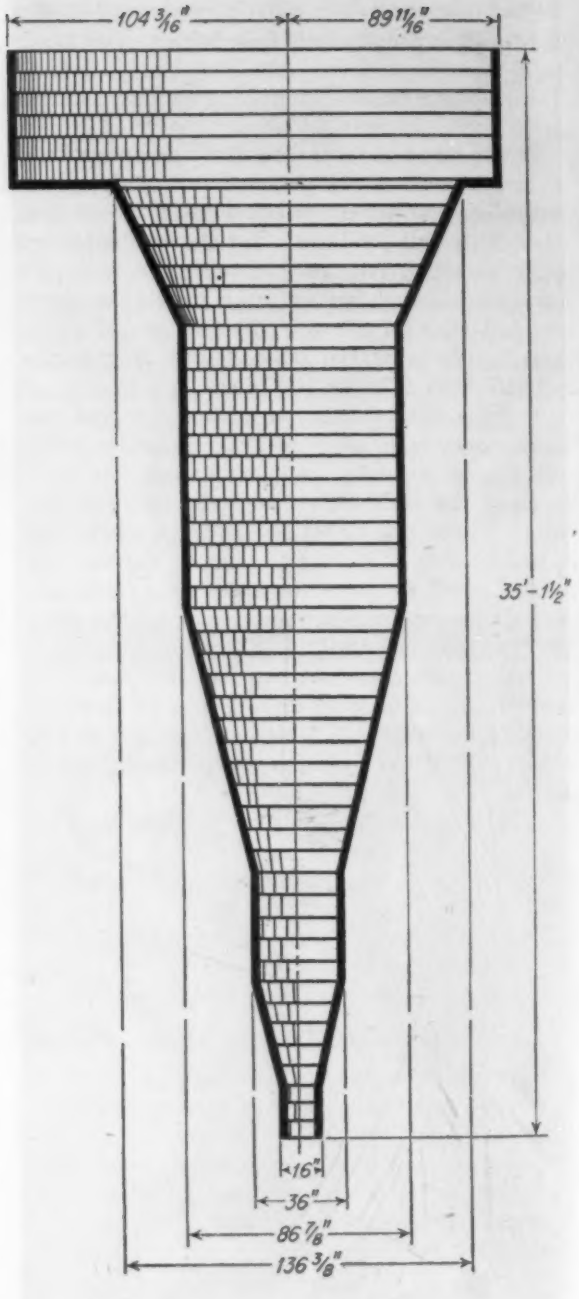
Resists abrasion—

Silicon Carbide Brick Lengthens Dust Collector Life

By W. D. LATIANO, Metallurgical Editor

◆ Dust collected from pans of ore sintering machines contains abrasive materials which cause considerable wear on the dust collector walls or lining . . . In one ore sintering plant, the steel shell lining originally used on dust collectors had very short service life.

◆ The substitution of hard burned brick linings helped but still required major repair every 8 to 14 days . . . Finally silicon carbide brick was used . . . After 7 years service the bricks are still less than half worn away and are in excellent condition.



Cyclone type dust collector lined with silicon carbide withstands severe abrasion action.

◆ ONE Canadian iron ore sintering plant supplying sinter to blast furnaces has increased the service life of dust collector linings from days to as much as seven years by using silicon carbide brick. The present silicon carbide linings have been in service for 7 years and are still in good condition. Only three minor repairs were made during this time.

Two types of burden sintered

When using hard-fired fire clay brick 2½ in. thick, the Canadian Furnace Co., Port Colborne, Ontario, was finding it necessary every 8 to 14 days to make major repairs to dust collectors working off their sintering machine. These were used to collect dust drawn from the sintering pans in one of their operations. The best life that could be expected from this lining was from 2 to 5 months before a complete relining job was necessary.

Because of the type of material being sintered at this plant the dust drawn off the sintering pan contained more than a normal amount of very abrasive particles that wear away the hard burned-brick in a very short time.

Two types of burden are usually sintered by this company. One burden is made up of 47 pct flue dust, 8 pct scale, and 45 pct return fines, the other is made up of 40 pct flue dust, 15 pct steeprock fines and 45 pct return fines. The burden is carried at a depth of approximately 9 in. No coke breeze is used since the flue dust provides adequate carbon and when scale is used no steeprock fines are used in the sinter.

The Greenawalt sintering machine used here is a single pan type and a total of 6 cyclone type dust collectors are used. Two of these collect off the sintering hopper and four are used off the sintering pan. Collectors No. 1 and 2 were connected in series and pulled dust from the front or feed half of the pan and No.'s 3 and 4 were connected to the back or exit half of the sintering pan.

Dust from the front half of the pan passes first through No. 2 collector where the heaviest particles are removed then the remaining lighter dust passes through No. 1 collector. Dust from the exit half of the sintering pan passes through the No. 3 collector then is finally cleaned by No. 4. No.'s 2 and 3 dust collectors therefore bear the brunt of the severe abrasion. When the machine is sintering 47 pct flue dust, 8 pct scale and 45 pct return fines the No. 1 collector picks up 144 lb of dust, No. 2 1050 lb, No. 3, 1080 lb and No. 4, 144 lb in a 24 hr. period.

Changed to silicon carbide

Previous to 1946 this company made it a regular practice to reline the collectors with standard 2½ in. hard burned brick. In the summer of 1946 they decided to try silicon carbide brick. The company had on hand a quantity of 4½ in. silicon carbide brick purchased from The Carborundum Co., for use as flue lining. These bricks were used to reline 2 collectors from automatic cone valve to scroll. Some silicon carbide bricks were also used to partially reline a third collector. The third collector showed some interesting comparisons. Hard-burned, acid-proof brick used with the silicon carbide brick was also 4½ in. thick.

After 7 years service it is estimated that No. 2 collector has handled approximately 2,500,000 lb of sinter dust and the lining from the scroll down is still in good condition. No. 4 collector after 2 years has had only ¼ in. maximum wear. The best service obtained from hard burned brick was 5 months when the lining was completely worn through to the metal shell in some spots.

Many other applications possible

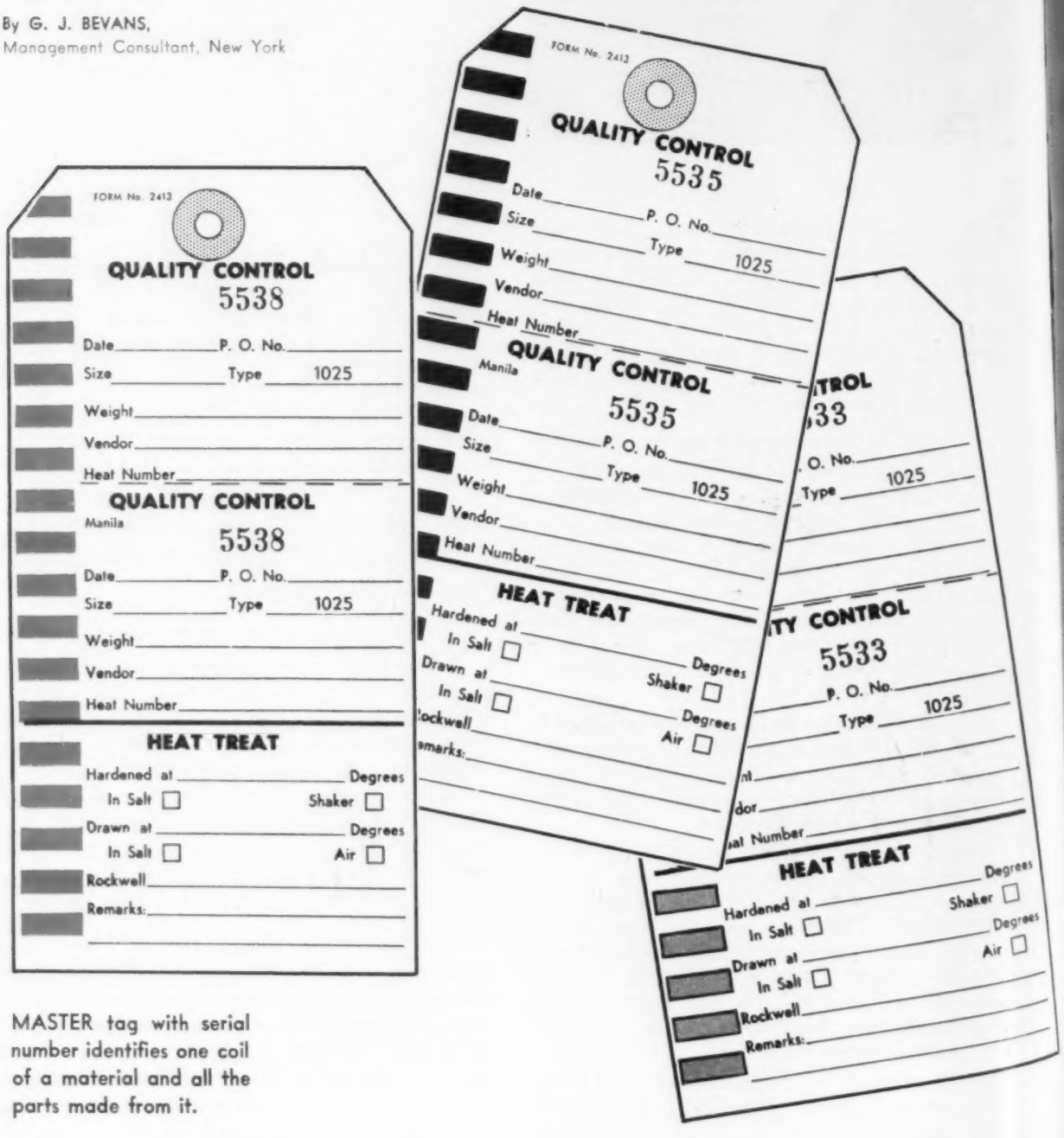
Other applications for silicon carbide bricks are skid rails for reheat furnaces, duct linings of gas generator sets, ash pit linings and blast furnace downcomer elbows. Many other possible applications are under consideration. These include: dry cleaner linings where such a unit follows a blast furnace dust catcher, blast furnace stack linings, critical areas of coke wharves. hopper linings, fuel bin throats, and housings of exhaust fans for air or gas carrying abrasive particles.

The use of silicon carbide brick on this application has indicated that no special bricklaying problem is created by the change from the hard-burned brick. In the repair and original lining with silicon carbide all that was necessary was good bricklaying practice using the least amount of mortar possible between the bricks.

Tag System Prevents Material Mixups in Small Part Fabrication

◆ The "mixed metals" problem is a serious one in many plants . . . Raw materials often look alike, but it's costly to make a production run with the wrong one . . . Tinnerman Products makes thousands of parts from similar appearing coiled stock . . . But a system of colored tags keeps all materials and parts continuously separated and positively identified . . . Tags ride the production line from start to final packaging, saving time, money and customer rejects.

By G. J. BEVANS,
Management Consultant, New York



MASTER tag with serial number identifies one coil of a material and all the parts made from it.

◆ A COLORED TAG system for continuous material identification and quality control has prevented mixups, cut scrap losses, saved machine and labor time, and reduced customer rejects at Tinnerman Products, Inc., Cleveland. The firm is a leading producer of metal fasteners, making over 8000 types from 20 basic alloys purchased in coiled sheet form.

A finer breakdown of raw material categories was the first step toward more accurate material identification during processing. The metals used were narrowed down to 20 quality grades: Eight for regular steel, four for stainless, five for aluminum, and one each for brass, bronze and copper.

These 20 material type designations were sent to Tinnerman's suppliers for approval. Suppliers were instructed to attach a vendor's tag to each coil of metal shipped. These tags list the Tinnerman purchase order number, material type, width and thickness, and the vendor's heat number.

To further identify these 20 metal types as coils arrive at the Tinnerman plant, the firm attaches 6 x 3 in. colored cardboard tags. Tag body colors are white, blue, green, yellow, orange, gray and brown. To extend these 7 colors to cover the 20 materials, some of the tags are border-printed with bars of a contrasting color. Thus a plain white tag identifies 1064 steel while a white tag with blue bars designates a coil of 1095 grade.

These quality control tags are perforated so that the lower section is easily detached from the upper. The upper section has spaces to record receiving date, purchase order number, coil size, metal type, vendor's name, and heat number.

The lower tag section is also subdivided. The upper half of this lower section repeats the data listed above the perforation line while the bottom half is used to record heat treating and test information.

Quality Control Color Code

TAG COLOR	MATERIAL TYPE
White—Plain	1064 Steel
White—Blue Bar	1095 Steel
White—Gray Bar	1025 Steel
White—Orange Bar	1020 Steel
White—Black Bar	1010 Steel
White—Cerise Bar	1008 Steel
White—Brown Bar	Pre-tempered Steel
Blue—Plain	1050 Steel
Green—Plain	302 Stainless
Green—Orange Bar	301 Stainless
Green—Blue Bar	410 Stainless
Green—Brown Bar	430 Stainless
Yellow—Plain	52S-O Aluminum
Yellow—Black Bar	24S-T Aluminum
Yellow—Blue Bar	24S-O Aluminum
Yellow—Orange Bar	3S-H Aluminum
Yellow—Green Bar	2S-O Aluminum
Orange—Plain	Brass
Gray—Plain	Phosphor Bronze
Brown—Plain	Beryllium Copper

Tag system in action

To follow the tag system in action, assume a shipment of steel coils has arrived at the receiving department on Tinnerman purchase order No. 700. A receiving clerk checks the vendor's tag against the purchase order. If there is any discrepancy the material is held in an "out of stores" location for proper disposition.

If no discrepancy exists, the receiving department makes out a master quality control tag for the first coil and a duplicate tag for each additional coil of the same material. The master tags are printed with serial numbers but the duplicates are not. Both, however, are similar in color, form and printed headings.

The numbered master tag for the first coil in any shipment is filled out with Tinnerman's purchase order number, the size, type and weight of the coil, vendor's heat number, and receiving date. Each similar coil receives a duplicate of the master tag, including serial number.

A clerk attaches the master control tag to the first coil, adding the suffix "A" after the material type designation. When the first duplicate tag is attached to the second coil the suffix "B" is added to the material type number. Similarly, the suffix "C" is written on the tag for the third coil, etc. If the shipment has more coils of the same type than the 26 alphabet letters, a new master quality control number is assigned to the excess coils and the procedure is repeated.

A new quality control number is also assigned a group of coils whenever any change occurs in size, material type, vendor's heat number, purchase order number, or receiving date.

When a shipment has thus been "tagged in," the lower section of the master control tag is torn off. It is sent to the testing laboratory with a sample of the coil it was attached to. Laboratory approval means that all coils in this group go into reserve stock in the slitting department. The laboratory then files the lower section of the master quality control tag.

When a coil is slit for further processing, the master tag is destroyed. Each of the new, narrow coils is given a new, small-size quality control tag, with the same quality control number and suffix letter that applied to the original coil.

As parts are fabricated from coil stock they are put in a tote can. Into this can goes a two-part processing tag, both parts of which receive the same quality control number and letter suffix that identified the parent coil.

When the end item is finished, the processing tag is torn apart. The top section goes to Finished Inventory Control while the lower section stays in the finished product container.

Whenever material does not react properly at any processing stage, all material with that control number is segregated for further analysis.

The management has found the system to be a simple, positive means of identifying material through all stages of processing.

Using two electrodes—

Series-Arc Welding, Novel Setup Solve Tough Cladding Job

◆ KEY TO A TOUGH JOB of cladding large turbine blades is the use of two Unionmelt welding heads connected in series. By using this method, S. Morgan Smith Co., York, Pa., is successfully applying corrosion and wear-resistant layers of stainless alloy over critical areas of the blades.

In series-arc welding, two electrodes are used. The current passes from one electrode to the other, and the workpiece is not connected to the welding power circuit. As a result, almost all of the welding power is used to melt the cladding wire. Correct welding conditions assure a thorough bond, without extensive melting of the base metal.

These turbine blades, which weigh about 10 tons each, are made of cast steel. Because of their weight and shape, they present some special problems in positioning the workpiece and guiding the welding machine. A curved track guides the dual-head machine around the outer rim of the blades. Each weld is applied in one continuous pass from leading to trailing edge. Succeeding beads overlap, and cladding progresses outward toward the rim.

The turbine blade is supported on three hydraulic jacks which are controlled by leveling valves attached to the welding head. As the welding machine moves along, the curvature of the blade causes a change in level and height of the welding zone. Any movement of the leveling-valve follower actuates the hydraulic jacks and automatically positions the blade so that the welding zone returns to proper level and height.

The tips of the blade are protected with larger cladding deposits where the effects of cavitation and erosion are greatest. For making straight welds along the leading and trailing edges of the blade, the machine is transferred to sections of straight track which are rolled into position.

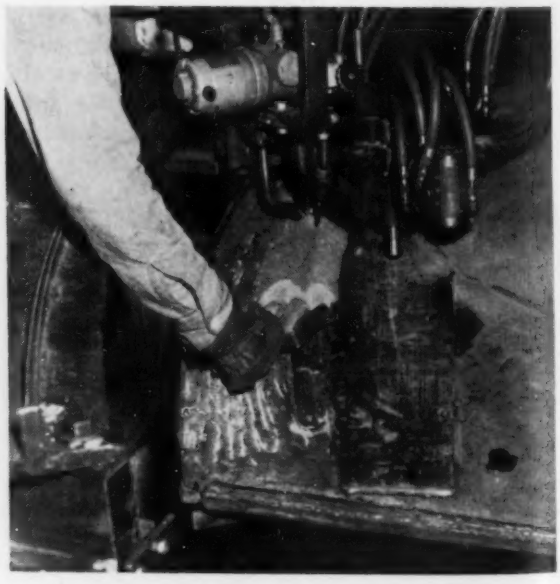
Unionmelt series-arc welding provides important advantages. Welding is fast in that 375 lb of Type U-304 stainless steel wire is deposited in 40 hours. The low, smooth deposits need only a minimum of finishing. Previous methods of cladding took about three times as long to apply, and about twice as long to finish.

High purity deposits

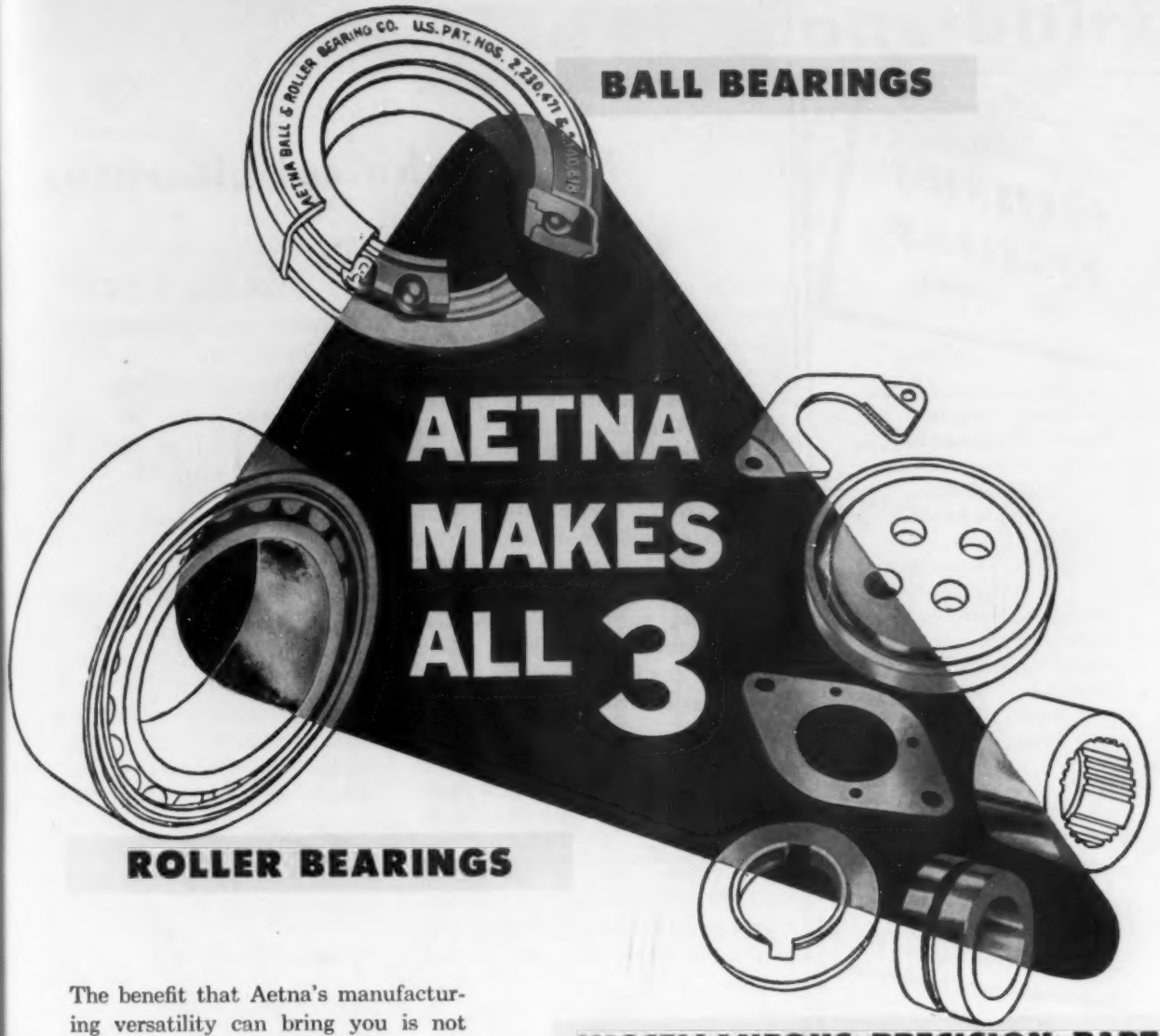
Metal deposited by series-arc welding is of very high purity. Dilution of weld metal by base metal is often less than 10 per cent. This makes it possible to use moderate-cost alloy wires instead of extra-cost high-alloy wires that would be required with other welding methods.

After welding, the blades are machined, balanced, and ground to mirror smoothness. They are produced for the McNary hydro-electric plant.

DUAL-HEAD welding machine on curved track applies corrosion and wear-resistant layer on 10-ton turbine blade by series-arc technique.



CLOSEUP of turbine blade tip shows initial cladding pass. Succeeding passes overlap to form a solid layer over critical blade areas.



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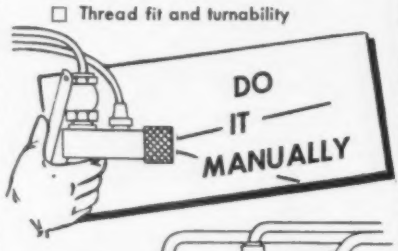
CHECK*

- ☐ Reduction of belt sanding stages
- ☐ Cutting down buffing time
- ☐ Reduction of hand polishing
- ☐ Blending directional grind lines
- ☐ Lowering micro-inch finishes
- ☐ Exposing cracks and fractures
- ☐ Smoothing belt marks
- ☐ Imparting non-directional finishes
- ☐ Semi-reflective surfacing
- ☐ Blending brush marks
- ☐ Surface uniformity
- ☐ Removal of stress marks
- ☐ Obliterating
  - ☐ Scores ☐ Tool marks
  - ☐ Reliefs ☐ Chatter
  - ☐ Pits ☐ Scratches
- ☐ Matte finishing
- ☐ Thread fit and turnability



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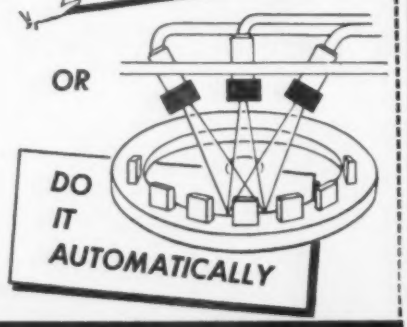

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Die casting

The die casting process and its application is covered in this new booklet. Die casting as it affects product design, machining requirements and surface finish is discussed. The basic steps of the process are shown. Zinc, aluminum, magnesium and copper base die casting alloys are discussed, with advantages and limitations given, Charts list for each alloy ASTM and SAE designations, composition by weight, mechanical properties and constants of each alloy. *American Zinc Institute, Inc.*

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Thermocouple elements

The Gordon line of Serv-Rite thermocouple elements and bare thermocouple wire is covered in this new bulletin. General application data for the various types of elements and the different metals are given. Included also are catalog numbers, sizes, prices and other ordering information. *Claud S. Gordon Co.*

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Spectrograph

The JAco Ebert plane grating spectrograph with order sorter is the topic of this new catalog. The new instrument is illustrated and described in detail. It is adapted to all spectra, from the simplest to the most complex. The order sorter is described, and its advantages are discussed. *Jarrell-Ash Co.*

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Taps and Dies

The Threadwell Tap & Die Co., Inc., complete line of taps, dies, counterbores and keyway broaches is covered in this industrial consumer net price list. Each product is pictured and described as to type, steel, shank, cutting size, and catalog number. *Threadwell Tap & Die Co.*

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Electric control

L&N electric control is the topic of this new booklet. The Series 60 control is featured. This series makes available a complete electric control system even better than Series 50, according to the booklet. Among features are more responsive control action, greater sensitivity and greater flexibility in tuning the unit. *Leeds & Northrup.*

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Coatings

Iridite Chromate Conversion Coatings for prevention of corrosion and paint-base treatment of nonferrous metals is the subject of this file of technical literature. The file folder classifies data by general information, metal to be treated and finishing processes. Information sheets give general technical and government specification data. *Allied Research Products, Inc.*

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Oxyacetylene

The use of oxyacetylene in rolling mills is discussed in this new booklet. The advance of oxygen cutting from routine hand maintenance to engineered scarfing and oxygen hot cut-off machines for standard production jobs is emphasized. Photographs show an actual installation of a hot cut-off machine in a large steel mill and a scarfing machine layout in this same mill. *Air Reduction Sales Co.*

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Catalogs & Bulletins

Radiography

Gamma-ray radiography with radioactive cobalt 60 and iridium 192 is the topic of this new catalog. Among advantages are lower cost, long half life, high energy output, ease of manipulation and application and no repair or service costs. Products are shown and features described. Tables and charts give additional information. *Mitchell Radiation Products Corp.*

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Brake manual

This brake manual illustrates how a single Di-Acro brake can be converted into a bar folder, tab former, radius former, open end brake, etc. The manual shows the variety of ways Di-Acro brakes can be set up for production or experimental forming jobs. Specifications and capacities are listed in tables. *O'Neil-Irwin Mfg. Co.*

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Electroplating

Soluble precious metals available for electroplating are covered in this new price card. Precious metal electroplating with scientific accuracy is discussed. *Technic, Inc.*

For free copy circle No. 10 on postcard, p. 171.

Refractories

The use of castable and gunning refractories in steel mill furnace construction and repair is the subject of this new bulletin. Fracto-crete #62, a castable refractory recommended for furnaces operating at temperatures up to and including 2450°F; super fracto-crete #70, recommended for duty between 2300 and 2850°F; gun-ram #80, for use in hot or cold patching and for gunning into forms for the construction of monolithic surfaces; and ramtite gun-mix #23, for hot patching of furnace walls and roofs, are all discussed in detail. *Ramtite Co.*

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Turn Page

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FREE TECHNICAL LITERATURE

Starters

A new line of Air-Bread Electric Starters for 2200-5000 volt motors is covered in this catalog. The folder illustrates starters using the EC&M type ZHA 50,000 kva Air-Bread Contactor. Sectional and complete views of each type are detailed and described. Reproductions of certificates of short circuit tests are included. *Electric Controller & Mfg. Co.*

For free copy circle No. 12 on postcard, p. 171.

Dielectric heating

Operating advantages of Allis-Chalmers dielectric heaters are described in this new bulletin. The bulletin tells how these heaters can help cut costs in heating, drying, baking or curing of nonconduction materials. The units available are discussed. Sizes and operations are given. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 13 on postcard, p. 171.

Alloy

The latest information on Hevimet, a high tungsten alloy, is given in this new technical data sheet. The machinability and other physical properties are given. This alloy is twice as heavy as lead and produced by powder metallurgy. A graph comparing the absorption rate of Hevimet and lead under a narrow beam of Cobalt 60 in included. Detailed mechanical, thermal, electrical and other property evaluations are given. *Carboloy Dept., General Electric Co.*

For free copy circle No. 14 on postcard, p. 171.

Separators

Eriez non-electric permanent magnetic separators for removal of unwanted iron are described in this new catalog. Complete information on the installation, technical data, specifications and available sizes is given. Among equipment described are plate magnets, magnetic humps, grate magnets, pipeline traps, ferrous cleaners, micromagnetic separators, magnetic pulleys, drums, sheet fanners, sweepers, hoppers and slurry drums. *Eriez Mfg. Co.*

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Turn Page

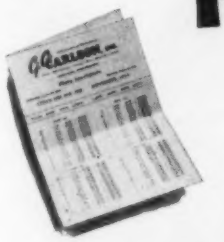
How you can save time and money when your blueprint calls for

STAINLESS STEEL PLATE

When your blueprint calls for stainless steel plate, you'll want material of highest quality, produced by specialists in the field, and delivered to you on time. When you want all that, and economy too, you'll find the answer at G. O. Carlson, Inc.

As one of the leading producers of stainless steel plates, heads, rings, forgings, flanges, and other stainless components, G. O. Carlson, Inc. uses the finest equipment in the industry to fill your orders quickly, efficiently and economically. Clean edges are a rule of the road with G. O. Carlson, Inc. which means a minimum of "trueing up" before fabrication. Plates will be rolled promptly to fill special orders, but many of your requirements can be filled from what is probably the largest stock of controlled analysis stainless steel plate available anywhere.

Call Carlson the next time your blueprints specify stainless steel plate or other stainless steel products.



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CANNON-MUSKEGON regularly produces a wide range of certified alloys to maintain one of industry's finest stocking programs. Immediately available are stainless steels in the 300 and 400 series *plus* certain carbon steels.

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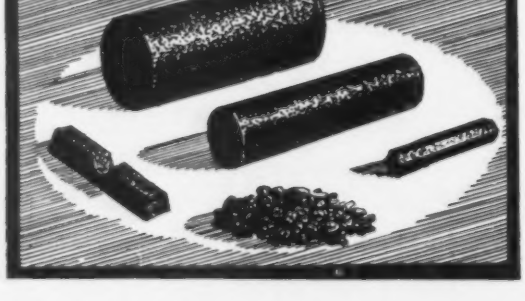
Preparation is begun immediately after your specifications are received. You get *exactly predictable* physical, chemical and electrical properties to your specific requirements. And, depending upon the form you order, alloys can be cast, forged, extruded and machined. Furnished regularly to investment casting foundries and other users are alloy tool steels, ferritic and austenitic stainless, alloys of cobalt and nickel-base, plus aeronautical-types for extreme high temperature applications.



MasterMet alloys are available in ingot, shot, billet or short (6" dia.) cast bar forms and are normally shipped in drums. Specifications, weight, lot and customer's order number are clearly imprinted on container, making selection and storage a simple matter.

*Cannon-Muskegon furnishes notarized certificates of analysis to meet prescribed metal specifications. For more information about this, and complete technical service, write for New MasterMet Bulletin.

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Welding

Resistance welding equipment is the subject of this new folder. Among equipment discussed are a double-end welder, contoured rings, stainless steel rings, odd-shaped rings and aluminum head rings. *Taylor-Winfield Corp.*

For free copy circle No. 16 on postcard, p. 171.

Products

Bellows Air Motors and Valves are the subject of this new bulletin. Complete dimensional details are given. Advantages of the air motors and valves are cited. Illustrations and specifications charts are included. Complete size and capacity designations are given. Accessory items are also shown. *Bellows Co.*

For free copy circle No. 17 on postcard, p. 171.

Steels

Tool and die steels are covered in this new comparison chart. General classification, SAE no., AISI nos., and JIC no. are given. Brand names used by leading mills are shown. *Uddeholm Co. of America, Inc.*

For free copy circle No. 18 on postcard, p. 171.

Phosphor bronze

Phosphor bronze strip is the topic of this new bulletin. General information is given on precision-rolled, close - tolerance strip in Grades A and C. Material furnished to thickness tolerances of 0.0002 in. to –0.0002 in. is described. Temper selection is discussed. Tables give specification and engineering properties. *Penn Precision Products, Inc.*

For free copy circle No. 19 on postcard, p. 171.

Heat exchangers

National heat exchangers of the shell and tube type are covered in this new bulletin. The building of heat exchangers to ASME, API or other specifications is reviewed. Heat exchangers in various stages of fabrication are shown. Drawings of heat exchangers show their component parts. Specifications are given. *Heat Transfer Div., The National Radiator Co.*

For free copy circle No. 20 on postcard, p. 171.

FORGING: By Remote Control

Manipulator operated from a distance permits precise positioning of forging ingot in press . . . Operator's task lightened . . . Handles 5-ton ingots in 1500-ton press.

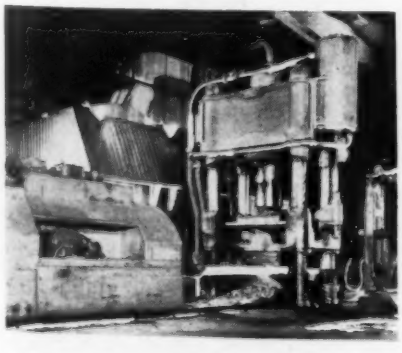
Precise, remote control of a 5-ton forging manipulator is now in operation at the Cameron Iron Works, Inc., Houston, Texas. The manipulator operator, positioned next to the press operator in an enclosure located next to the press, has excellent visibility and is not subject to the tiring effects encountered where the operator rides the equipment for an 8-hour shift.

The remote controlled manipulator, designed by Kendall Engineering Co., Alliance, Ohio, uses a vertical speed reducer manufactured by Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich., to operate the peel rotation of the manipulator.

Must Be Handled Smoothly

To enable the manipulator to operate at maximum efficiency, the ingot must be handled smoothly and precisely. In addition, the reducer operates under Class III service—24-hour, shock loading— so that an additional burden is placed on it from the standpoint of ruggedness and dependability.

Since the service conditions are unavoidable in the Cameron installation, Kendall engineers selected the 8-in. center distance Cone-Drive speed reducer with a 20:1 reduction ratio as the best available for the job. The reducer is driven by an 1800 rpm, 20 hp motor and has a more than adequate safety factor for the work required.



Remote control used . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 171. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

In service, the Kendall manipulator is used in the process of blooming down a 5-ton ingot under a 1500-ton steam, hydraulic high speed press. An overhead crane sets the ingot in the cradle adjacent to the press. The manipulator lifts the ingot from this cradle and handles it through the press during the entire blooming operation.

Pickling:

Perforated monel drum speeds pickling process.

A revolving pickling setup using perforated monel sheet has speeded pickling of couplings to 6000 pcs per hour and improved working conditions with longer equipment life.

Monel metal perforated by the Hendrick Mfg. Co. of Carbondale, Pa., and fabricated into lightweight pickling drums by Youngstown Welding and Engineering Co. is enabling Wheeling Steel to degrease and pickle 6000 lb of couplings an hour.

Drums Chute Loaded

The drums are chute loaded, picked up and passed through a pickling bath of 12 pct sulphuric

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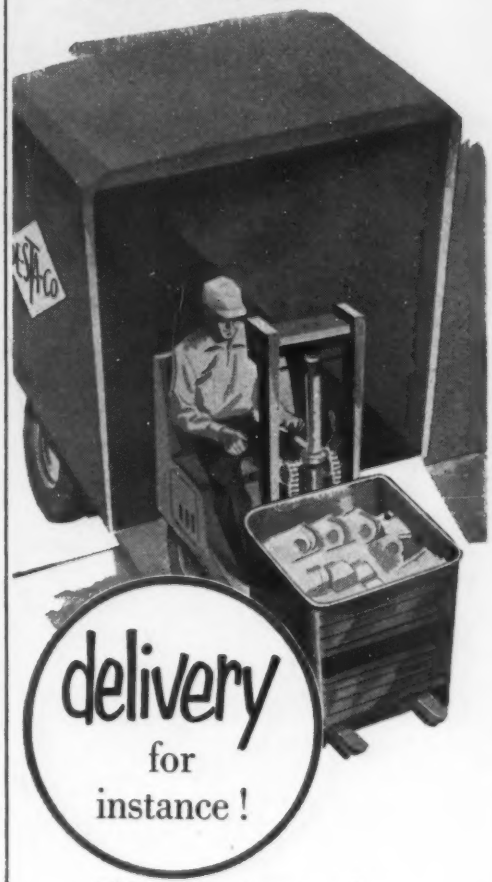

delivery for instance!

Think what it costs when your stampings aren't delivered on time.

Remember that *prompt delivery* – with a 39-year record to prove it – is just one of the plusses you get when you buy *Detroit* stampings.

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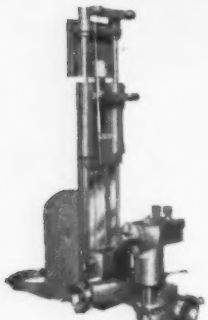

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Convert Your Machinery for Profitable Tool Room Work— or Mass Production . . . .

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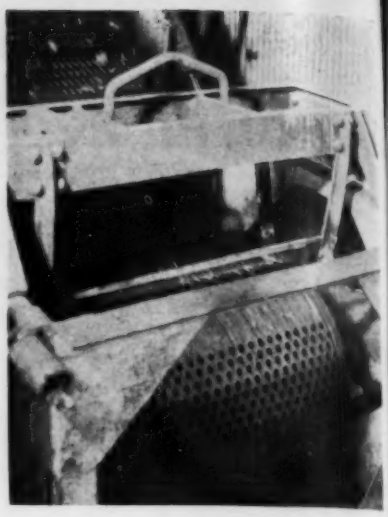


Drums speed handling . . .

at 160°-180°F. and then to successive washes. Because the drums are subjected to severe shock during materials handling and corrosion during the pickling and wash baths, it was of prime importance that they be fabricated of perforated Monel.

Affords Proper Draining

The perforated Monel not only stands up under wear and abrasion with minimum loss of metal but maintains uniformity of mesh, assures full hole clearance and affords proper draining at all times.

Because of these characteristics a thinner, lighter weight Monel can be used and optimum materials handling efficiency obtained.

Wear Plates:

New epoxy cements simplify use of carbide plates.

Ethoxylene resin thermo-setting cements, or epoxies as they are commonly called, have been found ideally suited for bonding sintered tungsten carbides to other metals for low temperature (below 250°

STEEL PAPER guide bar and carbide wear proofing strips. All parts are well cleaned to assure good bond, then preheated to 250°F.

F) wear-spot applications or wear-proofing of machine elements.

With epoxies, bonds with shear strength of up to 7500 psi and better are obtained using an application temperature of only 250° F and a curing temperature under 400° F, Kennametal Inc., Pittsburgh, has found.

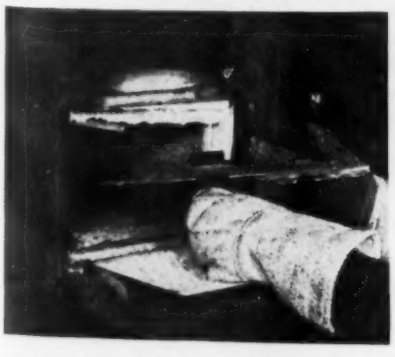
No fluxing is required; corrosion is eliminated; and annealing effects on base metal are kept to a minimum. Large wear strips can now be easily secured in place without brazing strains or distortion of parent metal which results when bonding is done by soft soldering or brazing; highly skilled labor is not required.

Has Many Applications

A typical example of epoxy bonding is shown in the accompanying photographs that illustrate the simple step-by-step procedure used for cementing carbide wear strips to a paper guide-bar—an important element in a cigarette making machine.

This new and interesting method has many possible industry-wide applications where higher temperatures prohibit brazing. Significant examples include: Guide or feed strips, some shear knives, patches for wear areas, gage parts, instrument parts, bushings (over steel posts), and machine parts.

Any spot where constant friction wears away steel on machine elements such as centerless grinder rests, slides, ways, gibs or tracks for cams or rollers may be easily wear-proofed by attaching the proper Kennametal surfaces with epoxy cements.



PLACING clamped assembly into electric furnace for curing at 400°F for 30 minutes.

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On certain jobs, a job-planned Towmotor performs more efficiently and more economically than fork-equipped lift trucks. Write for Certified Job Studies giving facts on materials handling savings in *your industry.*

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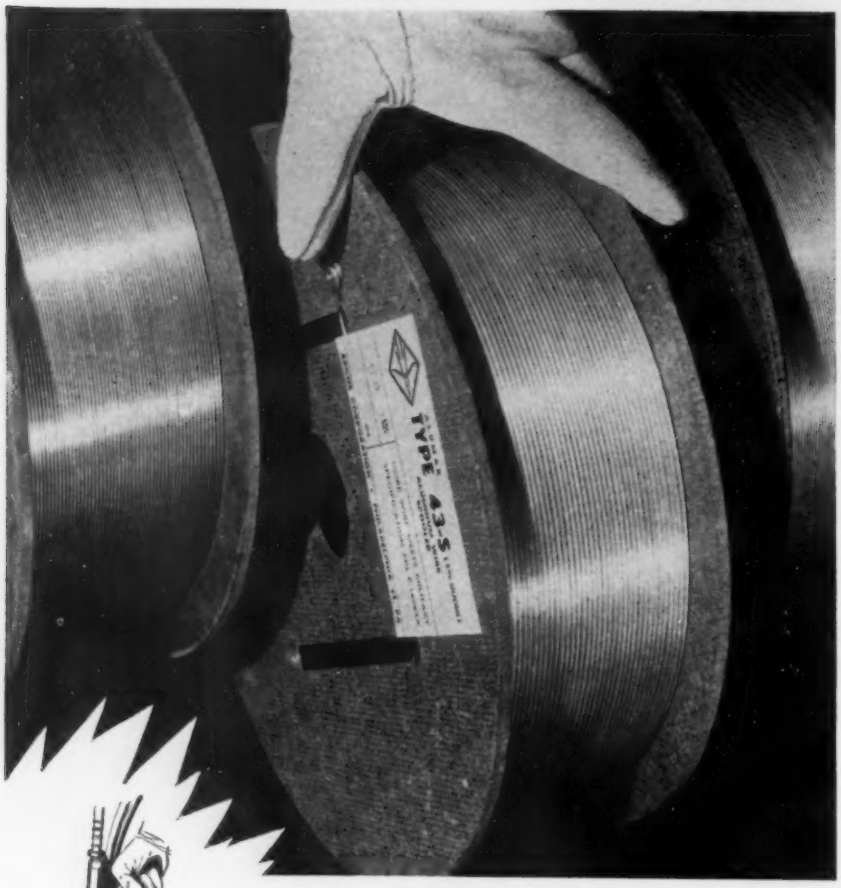
ARCOS FOR FINEST QUALITY WELDS



NEW aluminum spooled wire

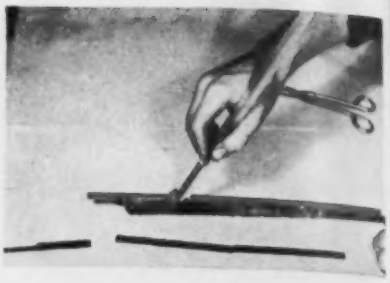
offers these advantages for inert gas welding

From the standpoint of economy and speed, the welding of aluminum by inert gas produces good welds, providing the aluminum wire is properly prepared for this process. Arcos has established the controls necessary to assure the high quality required for good welds. That's why it will pay you to specify Arcos ALUMAR Spooled Wire. Its uniform, clean finish gives better conductivity and arc stability. Each batch is pre-tested to assure you weld metal characteristics within a critically controlled range.

Write today for our new Bulletin on the complete line of Aluminum Wire—Spooled, Coiled, Straightened and Cut. For every aluminum welding job, Arcos offers the wire you need for the results you want. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pennsylvania.

WELD WITH ARCOS

ALUMINUM AND STAINLESS SPOOLED WIRE



APPLYING thermosetting cement to guide bar preheated to 250° F.

Epoxies, now made by a number of manufacturers, are available in powder, stick, paste, and liquid form to suit different industrial application requirements. Rod or stick form is suitable for bonding small areas.

Apply With Sieve

To use, preheat the metals to approximately 250° to 300° F. Powders may be applied with a sieve upon cold or heated metal surfaces which have been preheated to 250° to 300°F.

For bonding large surfaces, liquid forms may be brushed, sprayed-on or dipped. After predrying, the bonding operation is performed at 250° and 400°F. Paste products are generally applied onto cold surfaces by means of a spatula. After heating to 250° the paste becomes liquid. Epoxies have high fluidity and wetting characteristics and are generally applied to only one surface.

Clean Thoroughly First

To obtain best results both carbide and steel surfaces should be thoroughly cleaned by sandblasting or surface grinding. Do not overheat during the application period or portions of the bond will begin to harden or cure before other portions become fluid.

Once the fluid state is reached, only a slight pressure is necessary

BONDED ASSEMBLY, after curing for 30 minutes, ready to be cleaned up by surface grinding.

to obtain a joint thickness of about 0.004 in. required for a high-strength bond. However, clamping or jigging until curing is complete is advisable. Spring-type clamps are desirable because of steel's expansion.

Any of the following heating methods may be used: Gas-fired oven, electric furnace, oxyacetylene torch, gas-air torch, propane torch, resistance or induction heating. Hardening or curing is completed after following the heating schedule below which provides a shear strength over 5000 psi.

Time	Deg. F
24 hours	250
10 hours	275
5 hours	300
2 hours	325
1 hour	350
30 minutes	400
15 minutes	450
Application temperature	250°F.

Tabulated below are results of tests made on ChemoTec 721 thermosetting cement in powder form for bonding Kennametal tungsten carbide to steel.

Hardening Temperature, Deg. F	Hardening Time, Hours	Shear Strength, Psi
320	3.5	7850
320	4.0	7500
400	.5	8000
400	1.0	7600

Carbide wear strips up to 48 in. in length can now be bonded to steel machine elements.

Broaching:

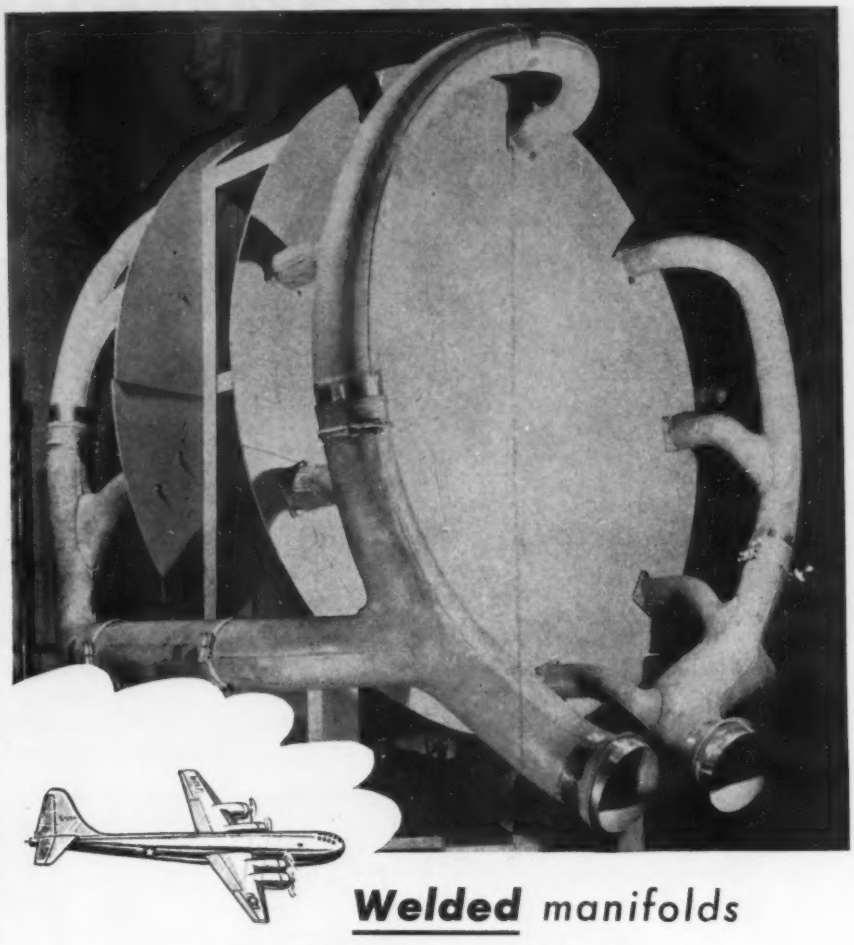
Improved tipped broaches cut bearing cap costs.

Shifting to cemented carbide-tipped broaches recently not only increased bearing cap broach life at one of the leading automakers by 2500 pct, but also reduced overall costs drastically. Plant engineers say the shift shaved overall costs — tooling — downtime — labor, etc.—approximately 22 pct on the first run.

Highly Abrasive Conditions

Broaching automobile bearing caps, like most broaching operations, is fairly tough on tools. The job is further complicated by the work material, highly abrasive

ARCOS FOR FINEST QUALITY WELDS



Welded manifolds handle a hot problem

For maximum efficiency, the engines of fast-flying bombers and skycruisers operate at high temperatures. Exhaust manifolds get red hot . . . actually spit fire. Manifold materials and the welds *must* meet unusually rigid specifications.

On critical applications like this, Arcos Stainless Rods and Electrodes will produce the welds that will *not* fail under the terrific heat and vibration involved. When you need weld metal of this caliber for severe service, remember that Arcos filler metals are triple tested—each grade for its physical, chemical, and metallurgical qualities. Conscientious quality control by Arcos eliminates the expense and uncertainty of trial and error welding. In less time . . . at less cost, you get dependable welds for longer service. For proof—order Arcos Stainless Rods and Electrodes for your next tough job.

Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.

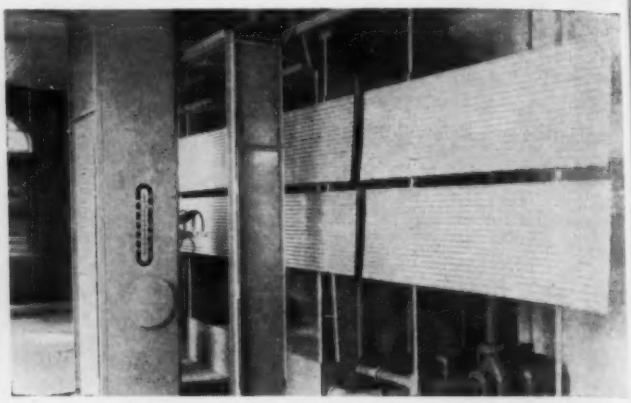
WELD WITH ARCOS

STAINLESS RODS AND ELECTRODES

Is automatic painting your next step to lower production costs?

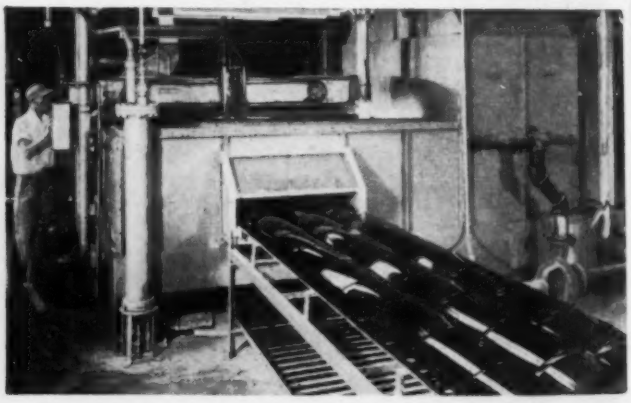
DeVilbiss Automatic Spray Machines cut finishing costs as much as 2/3 and reduce rejects to a negligible number for manufacturers of household appliances, building materials, industrial equipment, soft goods and thousands of other mass-produced items.

Vacuum cleaner housings like these are typical of the parts that can be finished automatically at rates from 540 to 4320 pieces per hour on DeVilbiss Chain-on-Edge Machines.



Parts traveling on overhead conveyors, such as these panels, can be quickly coated both front and back with any material on DeVilbiss Automatic Vertical Transverse Machines.

DeVilbiss Automatic Rotary Machines spray a great variety of industrial products economically and quickly, with absolute uniformity. The operator need only load and unload the table conveyor.



Coating speeds from 3,000 to 14,000 square feet per hour are possible with DeVilbiss Automatic Horizontal Transverse Machines. Here, carpet-sweeper tops emerge with a gleaming finish.

How about *your* company? Is there a job out in the shop that could benefit from the high speed, the smooth, uniform finishes DeVilbiss Automatic spray-painting equipment brings about? Whether you're working with flat objects, parts traveling on overhead conveyors or parts that require both inner and outer coatings, you'll find DeVilbiss has a wide variety of standardized automatic machines to serve you. Call your local DeVilbiss representative for full details.

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cast iron with a sandy surface condition. Conventional broaches wear rapidly under such highly abrasive conditions.

Work is done on a Cincinnati vertical broaching machine with 2 rams. Speed is 28 sfpm, chip load per tooth 0.005 in. for roughing and 0.0015 in. for finishing.

Use Push Type Broach

Special round, push type 3-section broaches are employed on the standard machine set-up. Each broach section has 12 teeth, and in operation only half the diameter contacts the part, thus two settings of the broach are made before removing for resharpening.

The former conventional broach operated a maximum of 24 hours, and sometimes failed completely after 1½ hours. Maximum production was 3600 parts. After tipping with Carboloy grade 883 cemented carbide, the initial broach ran 50 days on continuous production on 12-hour operating cycle, producing 90,000 parts on one setting without any service needed. Subsequent runs have consistently exceeded the initial performance.

KEEL PLATE of the Navy's newest submarine, the SS 576, is laid at the Groton, Conn., Yards of the Electric Boat Div. of General Dynamics Corp. The Diesel powered submarine, an improved version of the Tang class, will have greater underwater speed.

New Books:

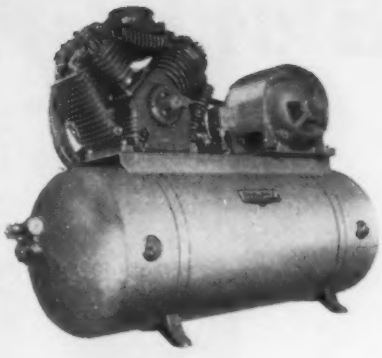
"Nickel in Iron and Steel," by A. M. Hall. Reviews and correlates data on nickel as an alloying element in steel and cast iron. Covers the physical properties of steels containing nickel, the structure and heat treatment of wrought and cast nickel steels, and the effect of nickel on various engineering properties. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 595 p. $10.00.

"Monomeric Acrylic Esters," by E. H. Riddle. Gives information on the properties, polymerization, copolymerization, chemical reactions, storage, handling and analytical methods of commercially available acrylate and methacrylate esters. Reinhold Publishing Corp., 430 Park Ave., New York 22. 221 p. $5.00.

"Job Evaluation," by J. L. Otis and R. H. Leukart. Presents the principles and meaning of various systems of job evaluation. Points out the steps necessary to establish wage and salary administration procedures based on job evaluation. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. 532 p. $6.50.

"You Can Give Orders That Get Action!" National Foremen's Institute. This booklet offers suggestions to supervisors who delegate orders to plant or factory employees. National Foremen's Institute, 100 Garfield Ave., New London, Conn. 25¢. 22 p.

"One Year LD-Oxygen Refining Process." Discusses manufacture of steel in two 30 ton converters by blowing pure oxygen downwards on to a metal bath of pig iron. Compares the quality of this steel with openhearth steels. Reviews the development of this process and the work necessary for erection and operation of this steel plant. Vereinigte Osterreichische Eisen und Stahlwerke, Linz-Donau, Germany. 56 p.



New DeVilbiss Air Compressor pays for itself

It's true. Many times a new DeVilbiss Air Compressor will actually pay for itself *out of power savings alone!* DeVilbiss Air Compressors give you up to 22.6% more air per power dollar. You gain, too, in lower maintenance and depreciation costs. If you have a compressed air problem, contact your local DeVilbiss jobber today.

Every DeVilbiss Air Compressor, from ½ to 15 hp., offers you: A Dependable DeVilbiss Compressor Unit, Check Valve Manifold, Automatic Pressure Switch, Quality Electric Motor or Gas Engine, A.S.M.E. Tank, Outlet Manifold and Quiet Efficiency V-belt Drive.

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"Thinness Control" means that the decimal thickness of each sheet is uniform throughout the length and width.

Job costs are figured on a square foot basis while stainless steel is purchased on a weight basis. When stainless steel is ordered by gauge number the permissible A.I.S.I. thickness variation is plus or minus 10%. If you receive material on the heavy side of the gauge range you are paying a premium for stainless surface area. For example, if you order 18 gauge, you may receive sheets .052" thick, when a thickness of .0475" would suit your purpose. On a standard 18 gauge sheet (36"x 120") each .001" in thickness weighs 1.26 pounds per sheet. In this example, each stainless sheet could weigh as much as 5.67 pounds more than required. You can readily see the advantages of specifying stainless rolled to the light side of the gauge range. MicroRold stainless is rolled to exceptionally close tolerances, as low as 3% average (plus or minus). Regular use of MicroRold provides more stainless area per ton or the equivalent area with lesser weight.

If you are not now a user of MicroRold sheet it will pay you to get the full details. Your steel distributor will gladly tell you the MicroRold story.

Washington Steel
Corporation
WASHINGTON PENNSYLVANIA

Mica Paper:

New method produces paper thin insulation sheets.

A new method of making thin mica sheets promises to make this material low enough in cost to compete with other forms of thin material.

The Integrated Mica Corporation of Woodmere, New York, has recently completed the design of new equipment which makes it possible to manufacture mica sheets of paper thickness at a price that will make it possible to substitute this for some of the better grades of paper now used in the electrical industry. The company claims that this material will also largely replace the finer qualities of asbestos paper that have found such great usage for electrical insulation.

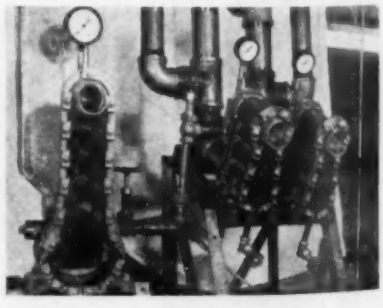
Flakes Overlap

The new type of paper is made entirely from overlapping mica flakes that hold together by cohesion, will not burn at any temperature, and has excellent wearing qualities.

The paper is now being made in a thickness varying from that of tissue paper to sheets an eighth of an inch thick.

No imported materials are used in the new mica paper. There are virtually inexhaustible supplies of mica scrap suitable for its manufacture in various parts of the country, particularly the western part of North Carolina.

In developing machinery for this new method it was soon found that the mere alteration of paper-mak-



Disintegrates mica . . .

Turn to p. 187

ing equipment would not do the job because of basic differences in the raw materials used. Consequently, completely different equipment was designed.

Mica is Disintegrated

Important units of this machinery are batteries of disintegrators which operate on high power jets. Streams of water moving at terrific velocities split the mica down to a thickness of less than one ten-thousandth of an inch. Feeding these are some of the largest proportioning pumps ever built.

Grinding:

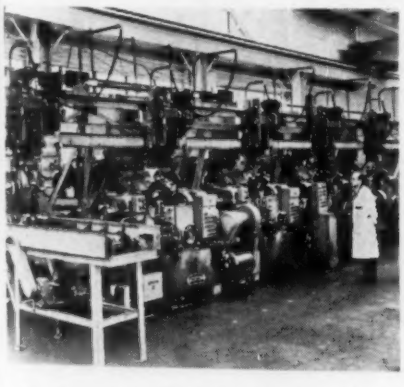
Automated unit will speed output of crankpins.

Grinding of automobile crankpins will be considerably speeded at the Utica, Mich., plant of Studebaker-Packard Corp. when a newly developed automated grinding unit is installed. Similar units, developed by the Norton Co., Worcester, Mass., will later be installed in plants of three other leading automakers.

The transfer type crankpin grinder picks up a crankshaft from a conveyor line, automatically locates the work in four successive grinding stations where the crankpins are ground to close tolerance limits. Finally, the machine places the finished work on a conveyor to be carried to the next operation.

One Shaft Per Minute

Estimated production rate is one complete shaft per minute throughout the entire working



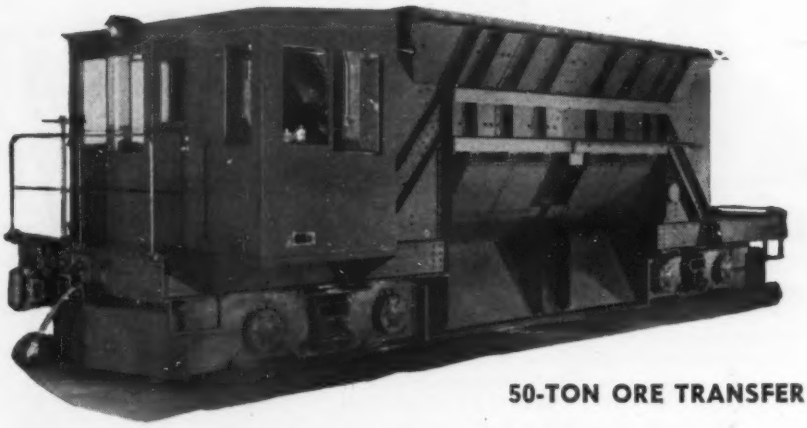
Automated grinding unit . .

On the HIGHLINE

100-TON
ORE TRANSFER

It's ATLAS ORE TRANSFERS

It's Atlas Transfers for dependable, year-in, year-out service . . . for operator safety and convenience which approaches semi-automatic service.



50-TON ORE TRANSFER

This Atlas Ore Transfer is equipped with modern hydraulically-operated discharge gates and brakes. Steel plate trucks are provided. The cab is overhung at one side to give the operator a line of vision alongside the car. The car is equipped with electrically heated hoppers.

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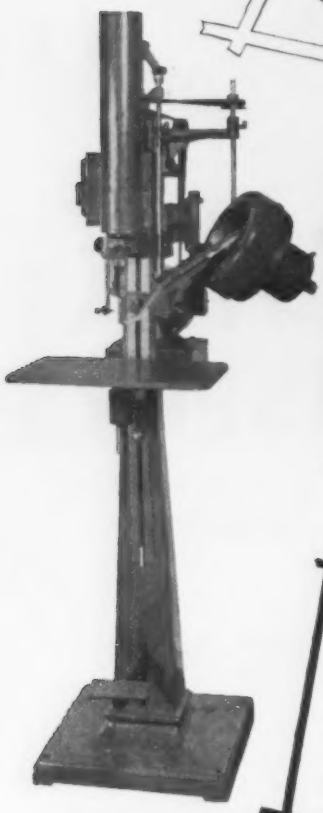

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day. This machine has been designed to do the work of up to six conventional crankpin grinders set up for semi-automatic operation.

Less Floor Space Needed

Floor space required by the new machine, 22 x 45 ft, is less than the area needed for conventional grinders of equivalent capacity. Because no operator fatigue factor is involved, the new machine can be expected to maintain a pre-set production rate all day.

For grinding V-8 shafts with four pins, two base units, each mounting two grinding wheel slides are required. A transfer unit is mounted over the four grinding stations. Cabinets for hydraulic and electric controls are located behind the machine for easy maintenance.

Longer Wheel Life Expected

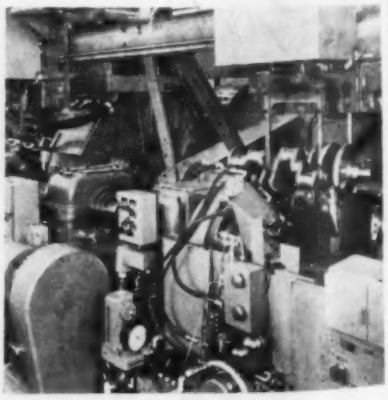
Grinding wheels are expected to last considerably longer on the new machine. There are two reasons for this.

(1) Automatic wheel truing at every work cycle, or at any pre-set number of cycles, eliminates the human element in truing which tends to remove too much of the wheel surface.

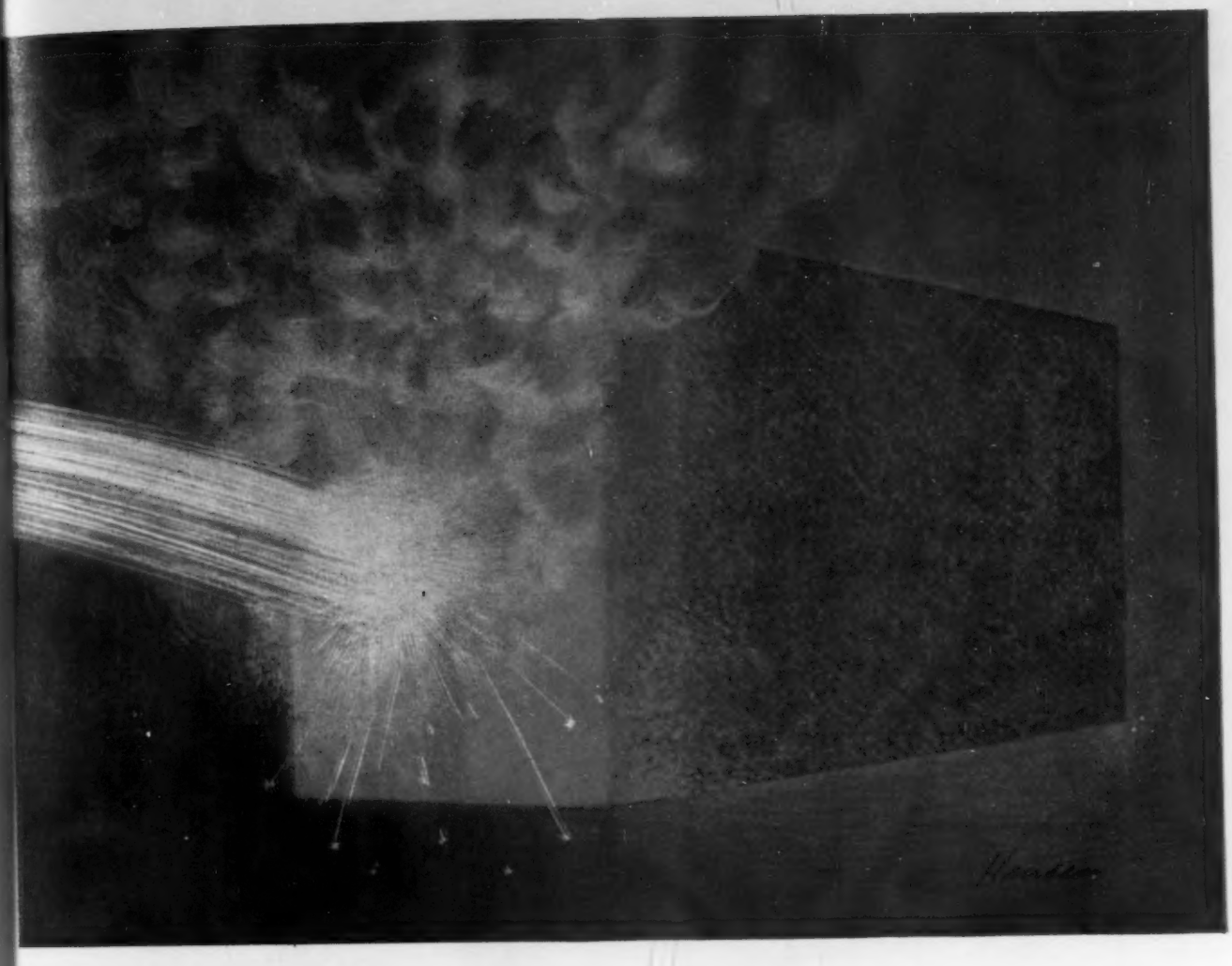
(2) The rigid, cartridge type bearing which supports the grinding wheel spindle at each end are already increasing wheel life substantially.

Controls Easily Accessible

Air operated gages, which measure the pin diameter during grinding, control the in-feed of



Speeds crankpin output . . .



Get longer end wall life at lower cost

with Permanente Periclase-Chrome A Brick

THE SPECIAL COMPOSITION of Permanente Periclase-Chrome A Brick has greatly increased end wall life in open hearth furnaces of leading steel producers—*often with thinner walls at lower cost!*

This composition reduces spalling to an absolute minimum—even under severe attack by iron oxide in exit gases. Here are some of the reasons why Permanente Periclase-Chrome A Brick gives better service:

1. **Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance, thus preventing end wall buckling.**
2. **Brick does not go through a liquid phase in forming its ceramic bond.**
3. **A ceramic bond is formed *before* the chemical bond is destroyed.**
4. **MgO content is higher than in other end wall brick.**
5. **In addition to the special composition, the brick's maximum density minimizes alteration by resisting gases and impurities.**

Let your Kaiser Chemical sales engineer show you how you can get longer life from your end walls with Permanente Periclase-Chrome A Brick. Wall thickness may often be greatly reduced with this superior brick, or *end wall life may be extended,* depending on the needs of your operation.

Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

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the grinding wheel. Electric and hydraulic controls are easily accessible. All terminal ends are clearly numbered for ease in trouble shooting and reassembly at the customer's plant.

Lubrication of the machine is automatic through a built-in lubrication system. JIC hydraulic and electrical standards have been followed in the design and construction of the machine.

Twelve electric motors are used. Four 25 hp, direct current, variable-speed motors drive the 42 in. crankpin grinding wheels at a constant peripheral speed. Two five horsepower motors drive the four workheads. Other motors operate the hydraulic equipment and transfer mechanism.

Machining:

Screw machined parts tooling studied in field tests.

Tool angle is an important consideration for screw machine operators where aluminum stock is substituted for brass in making screw machined parts. Typical changes necessary in making a conversion were recently studied by Kaiser Aluminum and Chemical Corp., Oakland, Calif. The tests were conducted by an independent medium-sized screw machine house, Don Wells Products, San Leandro, Calif.

The screw machine-produced parts in the tests included a threaded blowgun nozzle ¾ in. long and a knurled cap screw ⅜ in. long.

Metals Compared

Parts were run in brass and then in aluminum. Comparative information was based on lots of 10,000 for both brass and aluminum.

For both parts in brass the cutting tools were ground with a zero degree back rake. For use on the aluminum stock the cutting tools were ground with an approximate back rake of 10°.

In both tests it was found that the aluminum alloy 2011 (11S-T3) broke into small chips similar to brass. There was no problem working the screw machines up to maximum efficient speed.

Production Time the Same

In the case of the knurled part a savings of 33.7 pct was made by using aluminum and 24.9 pct on the nozzles. In all tests production time was the same for both metals. The economies stemmed from the more parts per pound obtained from the aluminum screw machine stock.

The knurled part was produced on a Brown & Sharpe, Model 0G (belt drive) screw machine. Spindle speed was 2660 r.p.m. and surface feet 345 per min. In threading, the spindle speed was 540 r.p.m. and surface feet was 53 per min. Cycle time was 6 sec and the screw machine produced a maximum of 420 parts per hr.

In the knurled test the aluminum

Cutting action compared..

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It actually costs less to do turning jobs on a Sheldon Precision Lathe. Machine-tool investment is cut to a fraction. Power cost is materially reduced. Less experienced operators can operate Sheldons safely and efficiently. Even cost-loadings for plant—floor space, heat and light are lower because two Sheldons can often operate in the space occupied by one large lathe.

On most "everyday" jobs a Sheldon will actually turn out more pieces per hour too. With double V-belts to the spindle Sheldon lathes deliver enough power to take heavy cuts in direct drive, at high speeds. Sheldon's "Zero Precision" Taper Roller Bearings permit work to the closest tolerances. Seldom are such extremely accurate bearings used in moderate priced lathes.

You will actually keep more as profit if you use Sheldon Lathes.

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stock was ½ in. round, alloy 2011 (11S-T3) weighing 0.240 lb per ft. The brass stock was ½ in. round, free machining, yellow brass weighing 0.7243 lb per ft. Tooling costs for both aluminum and brass in these tests were $15.45.

Savings per 1000 parts of $8.60 in aluminum compared with brass on the knurled cap screw. Substituting aluminum for brass on the blowgun nozzle showed similar results. The aluminum stock was ⅜ in. hexagon, 2011 alloy aluminum. The brass stock was ⅜ in. hexagon, free machining yellow brass.

The work was done on a Brown & Sharpe model OG (chain drive) screw machine. The spindle speed was 4,230 r.p.m. and surface feet 450 per min. In threading the spindle speed was 850 r.p.m. and surface feet, 85 per min.

Stock Weight Compared

Again the essential difference was in the stock. Weight per foot of aluminum was 0.143 lb compared with 0.45 lb in brass. Weight per 1000 pieces in the lighter metal was 10.3 lb while the amount of brass used in a like quantity was 32.4 lb. A total of 103 lb at $0.788 per lb was used of the aluminum and 324 lb of brass at $0.502 per lb.

The aluminum parts cost $23.12 per 1000, compared with $31.06 per 1000 in brass.

It was pointed out that aluminum, like all metals, has its own rate of thermal expansion and recommended coolants are necessary to assist in controlling this factor. Carbide-tipped tools are also recommended on long runs.

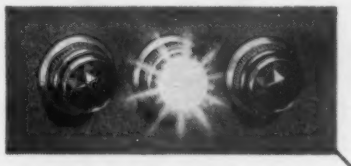
Testing:

Sixteen year creep study supports laboratory data.

Analysis of the rates of creep observed in two carbon molybdenum steel steam pipes after 100,000 hours of service at 900°F has resulted in a figure of 0.002 pct per 1000 hours or less under operating stress of 7500 psi. This is in agreement with predictions of laboratory creep data, it was reported recently at the annual meeting of the American Society of Mechanical Engineers in New York.

This unusual proof that short-time laboratory creep tests truly simulate service conditions was presented as a paper by four authors: R. J. Sinnott, The Detroit Edison Company, I. A. Rohrig, J. W. Freeman, and A. I. Rush, all of the University of Michigan's Engineering Research Institute, Detroit.

Analysis of the service conditions indicated that 100,000 hours of service at 900°F under 7500 psi would have been expected to use up only a negligible amount of the available creep-rupture life of the steel. All laboratory test results support this conclusion. Deterioration of creep strength from structural changes, such as spheroidization, was certainly no greater than might have been expected.



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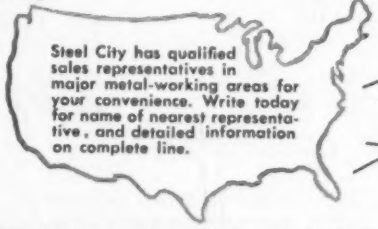
The right color flashes automatically during each test

Here is the machine that decides for you which pieces are of proper hardness. Ranges are adjustable, easily set up by using pieces of known hardness or test bars. Color-Glance Brinell Hardness Tester is another Steel City *first*. For more than 40 years Steel City has designed and built better machines, with your particular application in mind.

Ideal for automation.

The electrical circuits which operate the color signals can be used to physically sort parts after testing.

Patent Pending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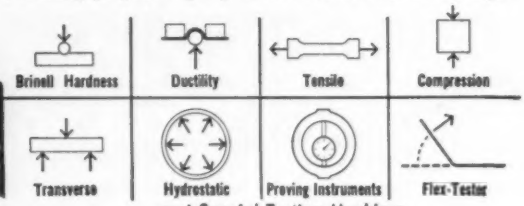

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***New*... hinged bridge gives snug, comfortable fit... self-adjusting to *any* facial contour!**

1. **New hinged bridge** combines the flexibility of cup-type goggles with the lightweight, compact protection of safety spectacles.
2. **One all-purpose size** permits universal fit. Bridge hinge gives automatic adjustment to any bridge width from 18-26 mm.; one eye size—47 mm.—fits everybody. *No need to stock a variety of bridge and eye sizes.*
3. **Plastic nose-and-cheek pads** provide *full closure* around eye cavity.
4. **Contour-shaped** adjustable plastic-and-cable temples hold spectacles firmly in place.
5. **Matching sideshields** are perforated plastic, providing protection at sides—*fold back* for pocket compactness.
6. **Butyrate frame**—*toughest plastic used for spectacles.* Standard frame is flesh colored, fitted with 6-curve Willson Super-Tough® glass lenses. Available also with green frame and sideshields, fitted with Willsonite® Super-Tough green glass lenses.

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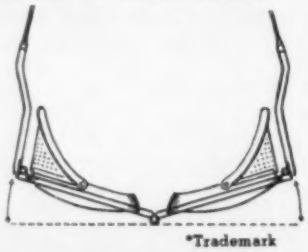
See how the unique hinged bridge allows the Contour-Spec to open up to fit broad faces and close up for narrow faces. It's this feature that allows Contour-Specs to contact the entire eye cavity and makes them fit so comfortably yet securely.



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Diecasting:

Water hydraulic systems offer advantages.

Centralized water hydraulic systems are becoming popular in diecasting operations because their use eliminates the possibility of an individual press shutting down because of oil pump failure.

The trend toward the use of water hydraulic systems by diecasting manufacturers is due to such advantages as reduction of fire hazard, saving of floor space and the much lower cost of water. A. F. Welsh of Worthington Corp.'s Reciprocating Pump Div., Harrison, N. J., recently reported.

Pumps Run at 157 rpm

An example is their use at Precision Castings Co.'s new plant at Fayetteville, N. Y., which diecasts parts for the automotive and the durable goods industries.

Several Worthington 2½x5 in. vertical pumps operating at 157 rpm with a resulting displacement of 50 gpm, discharge into accumulators at 1000 psi.

The intermittent demands of the accumulator system which supplies the hydraulic power for the diecasting machines are provided by these positive displacement pumps electrically controlled by a suction valve unloader installed on the suction side of the pump.

Water Cuts Operating Costs

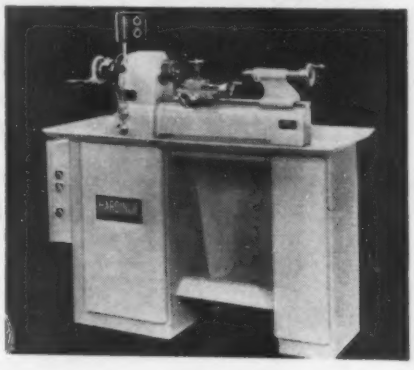
A large automobile manufacturer estimates that water hydraulic systems losses of hydraulic fluid are replaced at a relatively low cost. In the water hydraulic system the water is treated with from 1 to 5 pct soluble oil, thus preventing corrosion of moving parts exposed to the pumping liquid.

A water hydraulic system eliminates the fire hazard of a line break. Centralization of pumps, electric motors, steam turbines or other drives, air compressors, accumulators, and controls reduces the amount of floor space required, provides easier maintenance and reduces the number of parts.

NEW EQUIPMENT

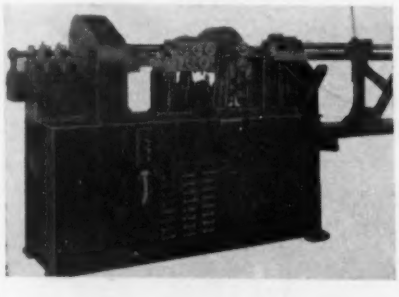
New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 171 or 172

Variable spindle speeds controlled by push button



Instantly variable spindle speeds from 230 to 3500 rpm are achieved by simple pushbutton control box located conveniently over the headstock on the new DV59 high speed precision lathe. Changes in spindle speed are accomplished by pressing either *faster* button or *slower* button until the desired speed is reached. A ball bearing, lever operated collet closer gives fast, easy, and positive collet gripping. The lathe is designed to meet requirements of extreme accuracy, high spindle speeds, and the ease of operation required for smaller diameter work range. Simplicity of operation enables relatively unskilled operators to produce parts to close limits without expensive tooling. *Hardinge Bros., Inc.*

For more data circle No. 35 on postcard, p. 171.



Straightens and cuts square and rectangular wire

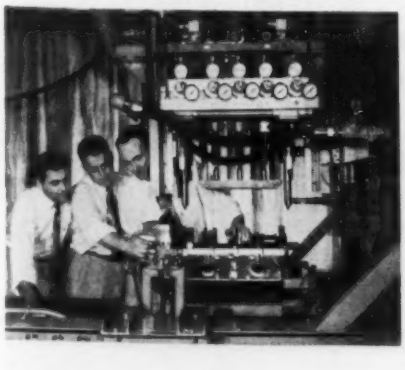
Square or hex wire, 3/16 to ¼ in., or flat wire 1/16 x ¼ in. to 3/32 x ½ in. are straightened and cut automatically on the new Model 2 ABF Shuster straightening machine. Multiple sets of precision straightening and feeding rolls handle the wire easily and uniformly for long production runs. Predetermined lengths are cut with accuracy due to the instantaneous clutch and cutoff. Almost continuous wire movement minimizes marking and assures square cut ends. *Mettler Machine Tool, Inc.*

For more data circle No. 36 on postcard, p. 171.

Giant surface grinder prefinishes steel blanks

Custom-built for the automotive industry, a giant surface grinding machine will be used to prefinish automotive bumperettes before they are preformed. The machine will substantially reduce, and in some cases completely eliminate, any further finishing operations prior to plating. The four head abrasive belt surface grinder uses progressively finer grinding belts. The machine takes stock to 20 in. wide and any length; is built for dry operation as well as wet abrasive grinding with cutting oil, or with water. Adjustments of grinding heads for various thicknesses of stock are pushbutton controlled. Conveyor speed is infinitely variable from 15 to 60 fpm. *Curtis Machine Corp.*

For more data circle No. 37 on postcard, p. 171.

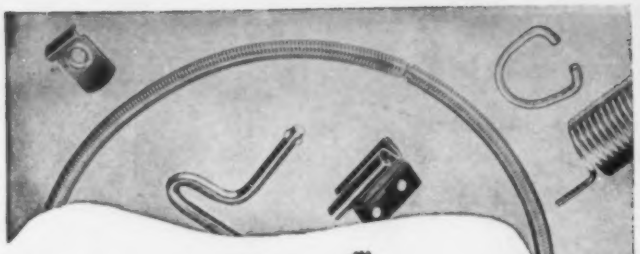


Machine sets 10 bolts on an engine block

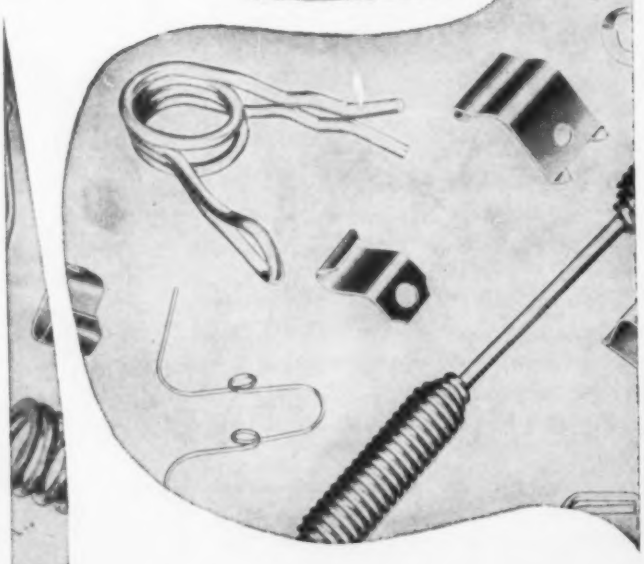
A ten-spindle electro-pneumatic nutsetter is a production line tool which runs down and tightens bearing cap bolts on the cylinder blocks of V-8 automobile engines. It is fully automatic and requires no operator. The nut running unit, powered by ten air motors, is self-supported in a structural steel framework and includes all wiring and piping necessary for actuating the mechanism. The machine straddles a continuous conveyor assembly line and the nut setting operation is performed while the cylinder blocks are moving. Rated capacity is 2000 bolts per hour. *Reed Roller Bit Co.*

For more data circle No. 38 on postcard, p. 171.

Turn Page



COIL SPRING SAYS:



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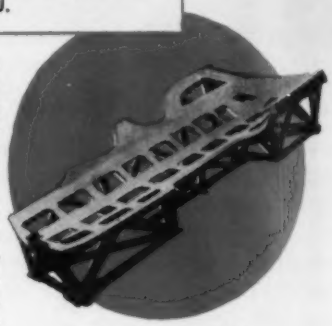

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1854 — 1954

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MILLDALE, CONN.

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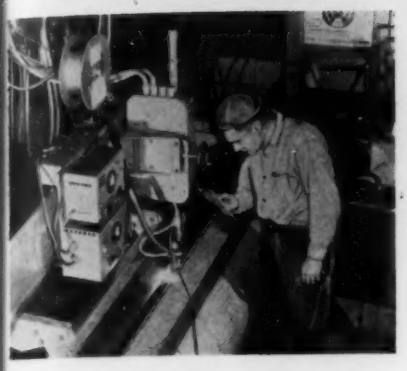


Electronic brain for inert gas arc welding

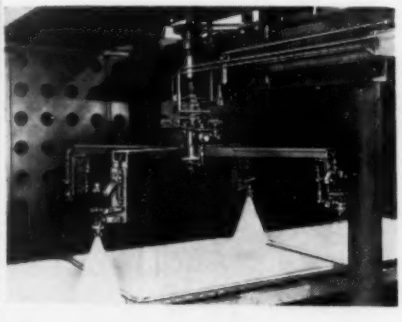
Strong and uniform fusion welds are assured when an electronically-controlled Heliarc HWM-2 voltage control is used with mechanized inert gas shielded arc welding. The HWM-2 maintains a constant arc voltage by governing the distance of the torch from the work. It also automatically turns torch cooling water and inert shielding gas on at the start and off at the finish of a weld. Front panel controls permit preselecting such operating characteristics as arc voltage, sensitivity to arc-voltage fluctuations, and method of arc starting. Once these conditions are set, the operator simply flips a switch to start the weld. *Linde Air Products Co.*

For more data circle No. 39 on postcard, p. 171.

Tool grinders sharpen all types of tool materials

Two new tool grinders, one using 6-in. wheels, the other using 14-in. wheels, are suitable for sharpening high speed steels, cast alloys and carbides. Both are double-end models with reversible motors, large, easily adjusted tool rest tables. The style 46-D is a general-purpose grinder using 6-in. plate type wheels for face grinding. It has inbuilt motor spindle that is permanently lubricated. Style 49-A is a heavy duty model for fast sharpening large tools and for rough grinding smaller sizes. Coolant system has control valves at each wheel. *Ex-Cell-O Corp.*

For more data circle No. 40 on postcard, p. 171.



Rotary spray painting unit finishes flatware

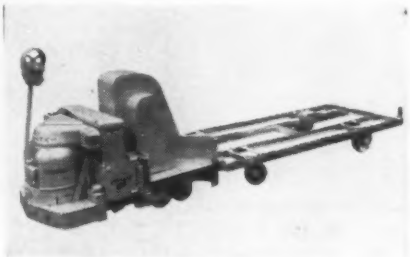
The new machine applies coatings of controllable thickness at conveyor speeds as high as 100 fpm. Four automatic spray guns mounted on four arms travel in a circular path above the conveyor. The guns are closely synchronized with the speed of the conveyor and the width of the product. Guns operate only when they are directly over the ware. Each gun turns on automatically when it approaches the edge of the product and shuts off as it leaves the product. Amount of finish applied is controlled by varying the speed of the rotary head. *Binks Mfg. Co.*

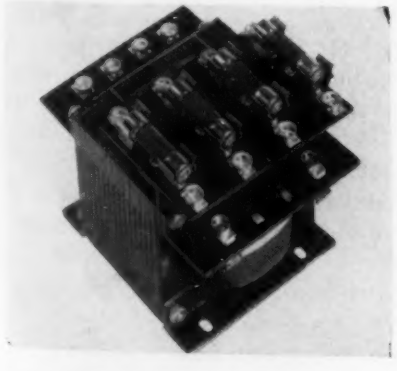
For more data circle No. 41 on postcard, p. 171.

Tractor couples to any trailer in 2 seconds

Industrial trailers can be coupled or uncoupled in two seconds with this new operator-led tractor with a universal grip. The Uni-Grip tractor will couple to any trailer of 5½ to 12¾ in. clearance from the floor, without use of special adaptors. The quick coupling is accomplished by a hydraulically-operated draw bar. The entire operation is completely governed by a single button in the operating handle. Wheelbase of the tractor when uncoupled is 30 in. *Automatic Transportation Co.*

For more data circle No. 42 on postcard, p. 171.





Machine tool transformer saves panel space

A line of machine tool transformers offer 100 combinations of ratings and accessories In 16 basic designs, the compact control transformers are designed to save panel space and reduce wiring costs by incorporating accessory connections, formerly mounted separately, directly into the basic transformer unit. The line includes volt-ampere ratings from 50 to 1500, with which there are 1000 combinations of frequency, voltage, physical arrangement of terminals, cable leads and circuit protection. Many accessory devices necessary in most applications of machine tool transformers have been factored into the individual design of each rating. *General Electric Co.*

For more data circle No. 43 on postcard, p. 171.

Turn Page

PUNCHES

DIES · RIVET SETS
COMPRESSION
RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service. *Since 1903*

Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. B for New Catalog 54

GEO. F. MARCHANT COMPANY

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IDEAL FOR WAREHOUSES, FOUNDRIES, ASSEMBLY FLOORS, ETC.

A 3 Motor-double girder floor controlled EUCLID CRANE underslung from 3 roof girders

This crane is ideal for buildings wherein headroom is a factor and maximum lateral movement is desired.

It's a three-motor, floor-controlled crane suspended from three I-beams. Note that the bridge clears the side columns by mere inches.

This permits the trolley to travel unusually close to the walls affording maximum use of the floor area.

There is a Euclid Crane to handle all conventional and unusual operations—or we'll design one to do the job.

EUCLID CRANES AND HOISTS *Raise Profits*

THE EUCLID CRANE & HOIST CO.

1361 CHARDON ROAD · EUCLID, OHIO

Magnetic drill press

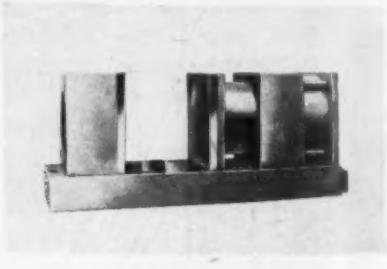
Metal drilling operations on walls, ceilings, and other difficult angles, are a one-man job with the new Bux magnetic press. The equipment is designed for easier drilling, reaming, tapping and counter-

sinking of structural shapes, bar stock, machinery, jigs and fixtures. Magnetic pull is over 800 lb. Tests indicate that the Bux model L-2 equipped with a ⅝ in. heavy duty drill, can produce up to ¾ in. holes in a 2-in. steel plate without a pilot hole. Unit operates on 115 v ac or dc. *Buck Mfg. Co.*

For more data circle No. 44 on postcard, p. 171.

Air-powered clamp

A new type air-powered holding device, the Vi-Speed Autovise Model 663, features deep jaws, 6x6 in., backed with a large 4¾ in. diam push rod. Jaws open to 8 in. on standard units. Powered by

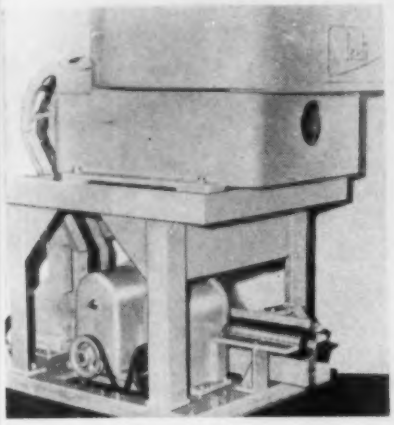


spring return air cylinders with 19:1 ratio on any line pressure to 150 psi with 3-in. air stroke. Stationary jaw is adjustable to 3 positions for holding materials up to 8 in. wide. Jaw faces are removable, and can be drilled and tapped for attachment of fixtures and dies. *Van Products Co.*

For more data circle No. 45 on postcard, p. 171.

Automatic feeder

An automatic thru-feeder was developed to automate the centerless grinding operations for bearing races. Parts are delivered from a Centri-feed hopper with their axes parallel. A stacking device then arranges the parts with their axes aligned and feeds them into a dual pair of feed disks. These carry the



parts to the grinder work rest and, by maintaining a constant and predetermined pressure, effectively maintain squareness and taper requirements. F-4 model accommodates parts ⅜ to 1¼ in. diam, F-7 handles 1¼ to 3-in. diam parts. *Kraus Design, Inc.*

For more data circle No. 46 on postcard, p. 171.

Control instruments

Two new instrument lines are Speedomax Type H controllers and Series 60 proportional - control units. Both are mounted in the Speedomax case when the equipment is to be used for proportional control. Speedomax Type H instruments are compact controllers, recorders or indicators, made in single-point only, at present only for temperatures, with thermocouple or Thermohm resistance thermometer as the sensing element. Instruments have relatively long measuring scales and employ the full length in setting the control point, which facilitates close control. Series 60 control unit functions between the Speedomax controller proper and the fuel valve or contactor in a proportional control system. It translates measurements into the correct regulating operations. *Leeds & Northrup Co.*

For more data circle No. 47 on postcard, p. 171.

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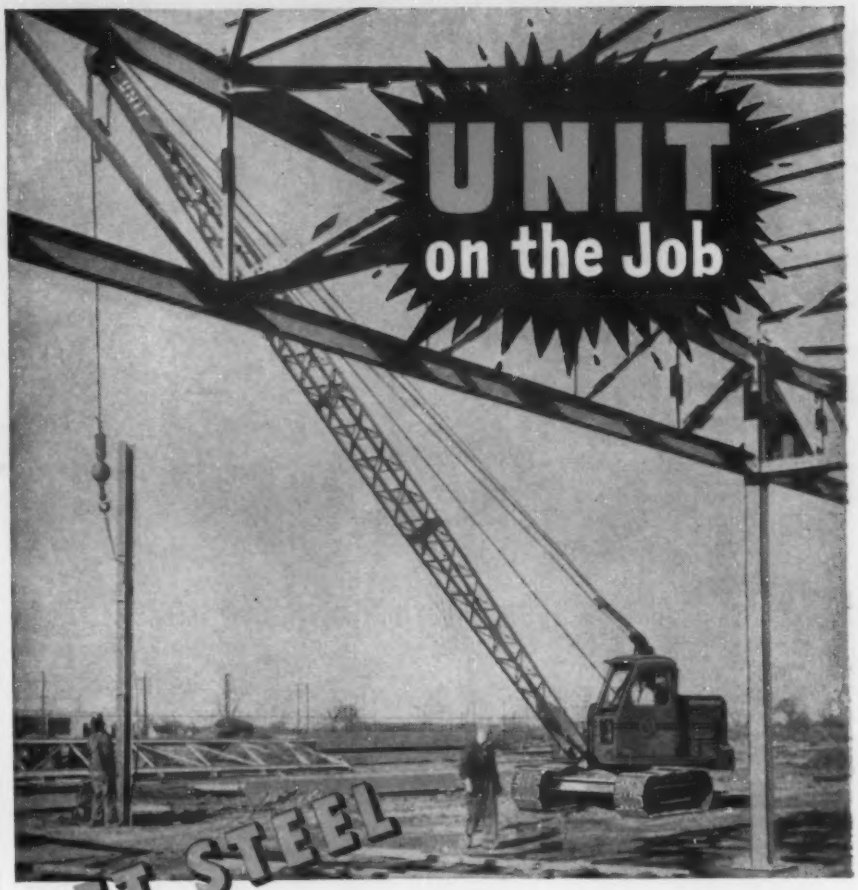

- Easy and Fast with **UNIT**

Lifting, carrying and spotting steel girders into the exact position requires STABILITY — FLEXIBILITY and PERFECT CONTROL. A UNIT Crane gives you all these features . . . and more. Extra Long Crawlers — Multiple Hinged Shoes — Wide Axles and Hook Rollers provide perfect stability. Smooth accurate control of boom and hoist lines permits precision handling. UNIT'S FULL VISION CAB gives the operator excellent visibility . . . makes steel setting jobs easier and faster. UNIT equipment can be quickly and easily converted to handle a wide variety of work. To speed up your steel construction, investigate UNIT. Write for literature.

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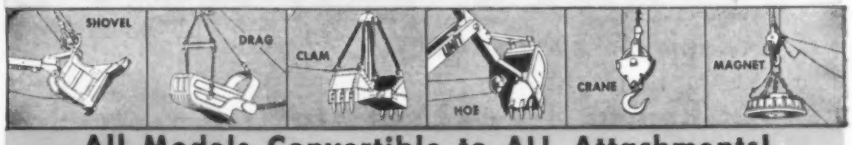
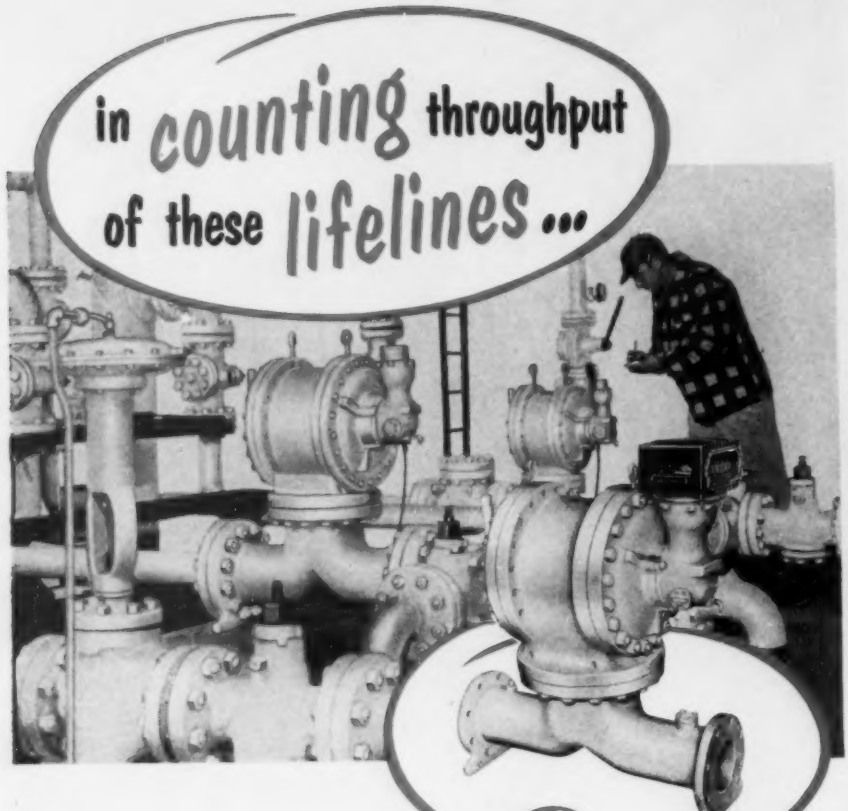
½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



All Models Convertible to ALL Attachments!



LEBANON STEEL Castings
are at work

WORLD WAR II proved that pipelines are lifelines that protect every man, woman and child in this country. Counting the billions of barrels of oil that flow through these lines is the job of huge meters—meters like Rockwell Manufacturing Company's type 5PH Rotocycles. And in many of these Rotocycle meters Lebanon CIRCLE Ⓛ steel castings are used for the body base and covers.

Accounting for pipeline throughput is a tough, rigorous service for meters, involving such factors as high pressures (up to 1000 p.s.i.), pulsations, sudden surges and stresses induced by the pumps that keep the oil flowing.

Not all Lebanon castings actually protect life but *every* Lebanon engineered component works without fail because it is a product of men who give to their job the knowledge, interest and care of true craftsmen.

● See—STEEL WITH A THOUSAND QUALITIES—37-min., 16mm, semi-technical, full-color, sound film on the making of steel castings. For information write: Dept. A, Lebanon Steel Foundry.

LEBANON Castings
CARBON, LOW ALLOY
AND STAINLESS STEEL

LEBANON STEEL FOUNDRY LEBANON, PA.

Zip-on pipe cover

A prefabricated, specially compounded poly-vinyl chloride acetate pipe covering finish is designed to protect insulation against weather, abrasion, chemicals, mildew, etc. Named Protektinsul, this pipe covering finish, furnished to exact

size, simply zips on and locks in place. Its integral all poly-vinyl closure insures a watertight and air tight longitudinal joint, and provides ease of application. Protektinsul requires no cutting, fitting, or sewing in the field. *Miracle Adhesives Corp.*

For more data circle No. 48 on postcard, p. 171.

Adaptable shelf rack

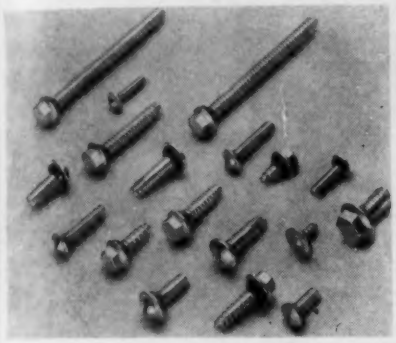
The NesTier shelf rack is a universally adaptable unit for use in stock room, maintenance, production and assembly. Fitted with a top of wood, metal or other material, the units become work-tables of convenient working height. The rack is used in conjunction with NesTier materials handling boxes

or baskets, which ride in and out on ball bearing progressive suspension slides like filing cabinet drawers. The rack is balanced so that it cannot tip over, even with all NesTiers full and in the extended position. *Chas. Wm. Doepke Mfg. Co., Inc.*

For more data circle No. 49 on postcard, p. 171.

Multi-purpose fastener

A new multi-purpose fastener with a one-piece metal washer head and assembled neoprene washer has been developed for use in preventing leaks, for protecting surfaces, absorbing shock and stopping squeaks. It is called Tuff-Tite. When the Tuff-Tite fastener is



seated, an undercut in the washer head traps and controls the flow of the neoprene at the outside edge, forming a perfect water-tight and air-tight seal. Neoprene washers can be pre-assembled and applied to screws, stove bolts, nails and special products. Fasteners are available in stainless, carbon and alloy steel and many nonferrous materials. *Townsend Co.*

For more data circle No. 50 on postcard, p. 171.

Heavy-duty carrier

Cutting costs and manhours in handling steel is claimed for a new 50,000-lb material carrier. Swinging shoe and rigid shoe models are

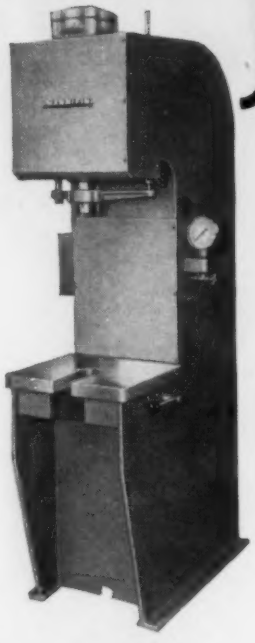
available in six standard sizes. They incorporate job-proved Gerlinger features plus special engineering for use by the iron and steel industry. The giant material carriers are available with twin-disk torque converter drive. *Gerlinger Carrier Co.*

For more data circle No. 51 on postcard, p. 171.

Turn Page

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES



1-TON	$ 552
2-TON	$ 627
5-TON	$1,286
8-TON	$1,581
10-TON	$1,855
25-TON	$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

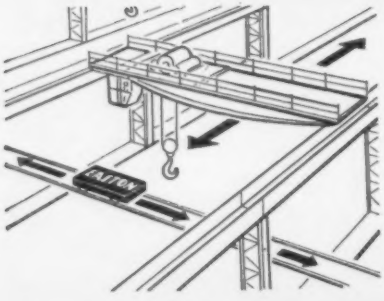
WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS

Cross-Bay Transfer

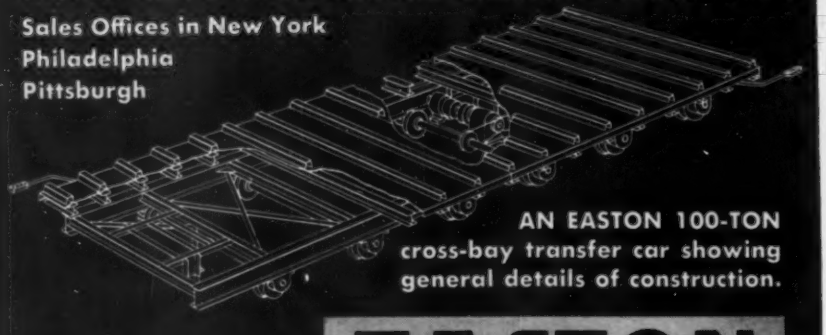
TRADE MARK



The EASTON motorized cross-bay transfer car is designed to provide lateral handling of materials to supplement overhead crane service in modern multiple bay plants. The cross-bay movement of the automatic transfer car provides a universal handling system able to spot a load anywhere on the floor of the plant. The same car system may also be used for moving materials between plant buildings.

EASTON CAR & CONSTRUCTION COMPANY · EASTON, PA.

Sales Offices in New York
Philadelphia
Pittsburgh



AN EASTON 100-TON cross-bay transfer car showing general details of construction.

EASTON®

A-1046

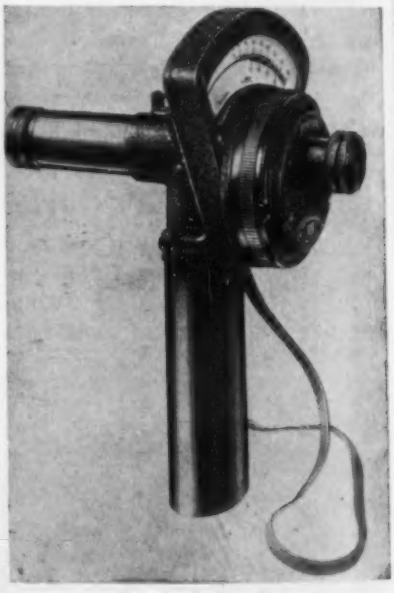
Case-hardening compound

Royal hardening powder is claimed to provide a simplified method for quick-surface hardening of steel tools, dies, parts and cutting implements. The compound is applied to areas heated to 1400°. 1700°F with heat maintained 15 to 30 min. then quenched for desired temper. A 0.01 to 0.02 case depth is said to provide longer tool life without brittleness for low-medium carbon steels. *Anti-Borax Compound Co.*

For more data circle No. 52 on postcard, p. 171.

Optical pyrometer

The H&B partial radiation optical pyrometer, Pyropto, is used for the measurement of temperatures of glowing masses in annealing, hardening and calcining furnaces; of molten or glowing metal or glass; of red-hot ingots when forging, pressing or rolling. Accuracy



of measurement renders the instrument fitted for testing thermoelectric pyrometers. The pyrometer is operated by a built-in storage battery and its range is from 1300° to 6300°F. All parts are in a dust-proof housing. Inexperienced persons may take accurate measurements with the instrument. *EPIC Inc.*

For more data circle No. 53 on postcard, p. 171.

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TRANSPORTATION EQUIPMENT

HOUSEHOLD APPLIANCES

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Digest of the Week in Metalworking

help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

Magnetic hand tool

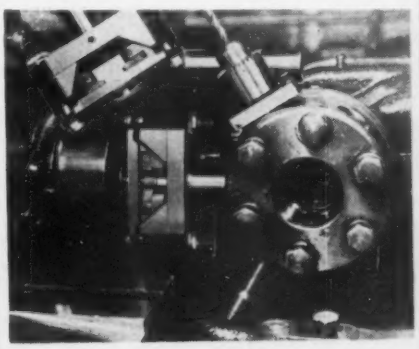
New hand tool for small parts handling consists of a heavy-duty permanent magnet, a manual-control lever and hand grip. It automatically picks up small parts, nails, screws, metal scrap, etc. and

is designed for rapid and easy manual operation in handling small ferrous material. Available in three models with capacities ranging from 3 to 9 lb, Magnetool has no batteries, but incorporates Alnico permanent magnet, guaranteed to last the life of the unit under normal usage. *Magnetool Div. of Multifinish Mfg. Co.*

For more data circle No. 54 on postcard, p. 171.

Knurling tools

Self-closing knurling tools require no special cams or synchronization of the lead and cross-slide cams. They operate directly off any pick-up cam. No back rest is needed, and only a slight adjustment is



necessary to adapt them to Gridley, National Acme, and other multi-spindle machines. These tools are balanced to eliminate all transverse thrust, so that bending of the work and undue stress on the spindle bearings are eliminated. *Barnaby Mfg. Co., Inc.*

For more data circle No. 55 on postcard, p. 171.

ask

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HOW

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STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or Feel.

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- Automatic Release
- All Capacities

in inch grams...inch ounces...inch pounds ...foot pounds (All sizes from 0-6000 ft. lbs.)

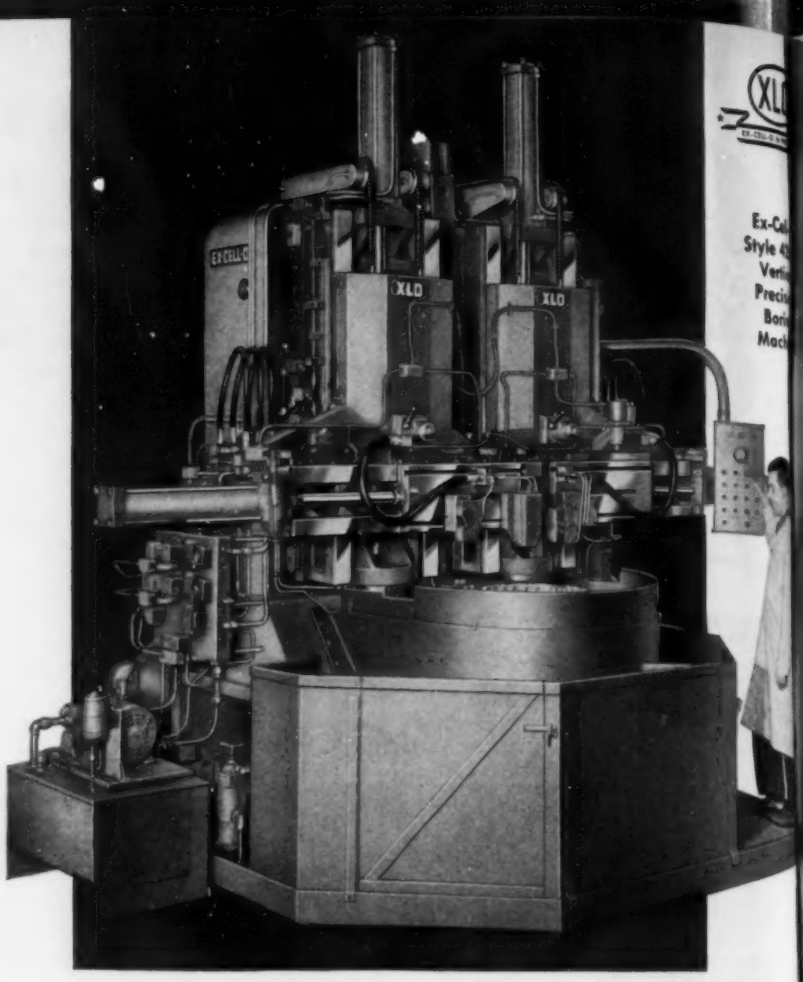
Every manufacturer, design and production man should have this valuable data. Sent upon request.

PA STURTEVANT CO ADDISON QUALITY ILLINOIS

Versatile, Automatic

BORING, TURNING, FACING OF LARGE PARTS -

WITH THIS



EX-CELL-O VERTICAL PRECISION BORING MACHINE

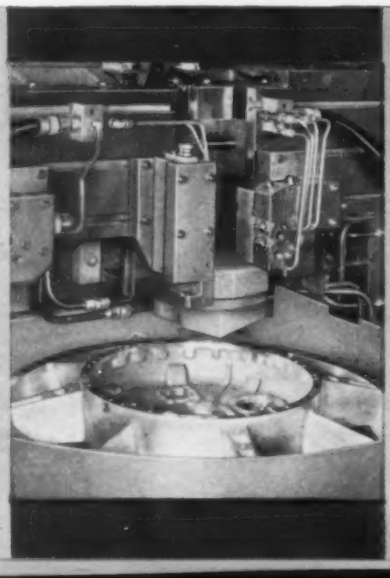
Developed by Ex-Cell-O, this standard Style 425-A Vertical Precision Boring Machine is massive and versatile. It has a heavy-duty, high-speed work spindle and rigid tool slides for close-tolerance work with a fine surface finish. It's designed for accurate production work on large parts.

The heavy cast base supports a column on which two vertical slides are mounted, each carrying a cross slide. Slides are operated by large hydraulic cylinders and move on hardened and ground steel ways. Vertical slides are fully counterweighted. All these features mean smoother operation.

The large work spindle supports a 36-inch diameter table having T-slots for mounting fixtures. The table is driven through a precision worm at variable speeds up to 500 rpm.

The machining cycle is completely automatic, including movements of vertical and cross slides, changes in work speeds, flow of coolant, and lubrication.

For more information and complete specifications on this 425-A machine call in your Ex-Cell-O representative or contact Ex-Cell-O in Detroit today.



Close-up view of a Style 425-A equipped for operations on a jet compressor frame. Tools in the left slide face 2 surfaces, turn one diameter and chamfer one edge. The right-hand slide carries tools for feed-facing, precision boring and chamfering.

12 Features OF EX-CELL-O'S 425-A MACHINE:

- Massive, Rigid Construction
- Easy Loading and Unloading
- Variable Speeds to 500 RPM
- Counterweighted Slides
- Large Hydraulic Cylinders
- Hardened and Ground Ways
- Flexible Automatic Cycles
- Automatic Speed Changes
- Automatic Coolant Control
- Automatic Lubrication
- Conforms to J.I.C. Standards
- Skilled Operator Unnecessary

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

54-4

The Iron Age SUMMARY . . .

Ingot rate rises to 82.0 pct of capacity, another new high for year . . .
New orders still exceed production at most mills.

Production . . . Steel production is expected to reach another new high for the year this week. Operations are scheduled at 82.0 pct of rated capacity, up one point from last week. The steel ingot production index is estimated at 122 (1947-49=100).

The way business is coming in production may go still higher before it eases slightly for the holidays. Mills are anxious to turn out as much tonnage as possible without operating on fitful schedules which are costly.

New Orders . . . The trend is still toward more new orders, bigger backlogs, and extended delivery schedules. This means that new business is still coming in faster than the finished steel is being produced and shipped. So the outlook, at least through the first quarter of next year, is very bright.

Strongest influx of new orders is on cold-rolled sheets, galvanized sheets (especially from continuous galvanizing lines), wire used in upholstery, and silicon sheets used in electric motors. But mills are even more pleased by recent strong gains in demand for hot-rolled and cold finished carbon bars, hot-rolled sheets, and stainless and alloy products.

Improvement in demand for alloy steels is one of the reasons the operating rate for electric furnaces has been rising faster than the operating rate for openhearth furnaces.

Distribution . . . Warehouse business has been improving steadily, if not as spectacularly as mill business. Actually the upturn in steel was noted first by warehouses early last summer. Galvanized sheets and cold-rolled sheets are in strongest demand at distributor level.

Some warehouses have not been able to get the "quotas" they wanted from their regular suppliers for first quarter delivery. They can still get their orders filled by shopping around, but they'll probably have to pay more freight.

Steel salesmen close to the Detroit market report the auto industry is gearing even higher production schedules. The industry is encouraged by enthusiastic response of the public to its new models, and producers are pulling out all production stops to help them reach the customer first.

Prices . . . Despite the rising trend of steel production, steel scrap prices are edging down. This week THE IRON AGE Steel Scrap Composite price slipped another 16¢ a ton to $32.17 per gross ton.

Steel Output, Operating Rates

Production	This Week†	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,944	1,941	1,874	1,955
Ingot Index				
(1947—49=100)	121.0	120.8	116.7	121.7
Operating Rates				
Chicago	89.5	90.0	81.5	95.5
Pittsburgh	77.0	78.0	76.0	90.0
Philadelphia	71.0	71.0	68.5	91.0
Valley	79.0	79.0	74.0	83.0
West	85.0	79.5*	79.5	89.0
Detroit	94.0	83.0*	100.0	86.0
Buffalo	100.0	97.5	95.5	79.5
Cleveland	90.5	84.0*	80.0	83.0
Birmingham	66.5	64.0	64.0	96.5
S. Ohio River	78.0	85.0	85.0	78.0
Wheeling	98.0	96.0	96.0	88.0
St. Louis	80.0	83.0	87.0	83.5
East	74.0	64.0	51.0	87.0
Aggregate	82.0	81.0	78.5	86.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.798	4.632
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$32.17	$32.33	$34.00	$32.00
Nonferrous				
Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	67.67	67.67	63.08	63.08
Tin, Straits, N. Y.	89.875	89.875	90.625	85.75
Zinc, E. St. Louis	11.50	11.50	11.50	10.00

Market Uptrend Continues

Only a few seasonal softenings mar picture of solid increases . . . Cold-rolled sheets romping into second quarter . . . Carbon, alloy bars continue improvement.

◆ WITH FEW exceptions, steel product demand is on the plus side this week. And those that have softened are off only seasonally, are likely to be giving the market an added nudge some time in the first quarter.

The tinplate market seems to be riding the bottom of the trough temporarily, due to heavy consumer and producer inventories, but the mills look for an upturn in March. While still in good demand, oil country goods have softened slightly, probably due to inventory correction and increased productive capacity. Plates and structurals are holding about even at a relatively slow pace.

Still pacing the market are cold-rolled sheets, galvanized, long ternes, and enameling sheets. Silicon sheets, reflecting the improved appliance market, are moving up.

Gaining more strength are hot-rolled and cold-finished carbon bars, alloy bars, manufacturers' wire, and spring wire.

A major sales effort to increase sales of nuts and bolts by stationing specialist salesmen in each of its major offices was announced this week by Republic Steel Co. at Cleveland.

General line steel salesmen have traditionally preferred to sell a carload of steel rather than push nuts and bolts in a highly competitive market, a spokesman said last week. To bolster its share of the market, the firm will begin training salesmen in major offices and will sell in competition with specialized manufacturers. In effect they will double the sales force on this line of products.

SHEETS . . . In **Chicago**, the cold-rolled sheet market may be on the verge of moving out into second quarter; at least, bookings for second-quarter delivery are under consideration: tonnage requests by some warehouses have been trimmed. In **Cleveland**, some gages and widths are being rolled on tin plate cold-reduction mills to hold delivery to January and February. In **Pittsburgh**, cold-rolled is the one product giving mills serious trouble; requests for emergency deliveries are fouling up schedules. Hot-rolled sheets and strip are moving up on a "me, too" basis. Enameling sheets are strong.

GALVANIZED SHEETS . . . The market is tight as a drum. Continuous galvanized bookings are well into first quarter generally—beyond that in the **East**. Hot-dipped also strong. But help is on the way. In **Chicago**, a third continuous-galvanized line is expected to be operating late next year. Other mills are known to be considering or planning new galvanized capacity.

TIN PLATE . . . Market is dull, plagued by inventories in consumer plants and mills. One large consumer is planning to cut first-quarter requirements drastically. But outlook for first quarter is considered fair, and probability is that demand will begin to perk up in late February and March. Long terne demand is strong.

SILICON SHEETS . . . Reports from all centers indicate that this market is gaining strength rapidly on the wings of a pickup in appliance manufacture and other electrical equipment.

BARS . . . Strength in carbon bars, both hot-rolled and cold-finished, is extending to producing centers some distance away from **Detroit**, indicating that the big push is on its way. Alloy bars also have been picking up speed gradually.

PIPE AND TUBING . . . Butt-weld pipe is holding steady at a firm level. Oil country goods off slightly but still strong. Linepipe is slow but producers look for a strong upsurge some time in first quarter on basis of pipeline projects pending.

STRUCTURALS . . . Seasonal influences appear to be affecting demand for standard structurals slightly. But wide-flange beams are still holding up. Light structural sections, used largely in smaller buildings, are strong.

WIRE . . . In **Cleveland**, November shipments exceeded estimates by a substantial margin; automotive demand is holding up the market for manufacturers' wire and spring wire; some business being booked for first-quarter delivery. This is offset by seasonal decline in merchant products.

WAREHOUSE . . . Strong demand for cold-rolled sheets is rubbing off on warehouses in **Detroit** area, where even large consumers who normally get requirements direct from mill are picking up tonnages at warehouses to tide them over. In **Chicago**, sales are strong except in cold-finished bars and distributors are ordering heavily from the mills. Warehouses are still fighting for business in **Cleveland** but some regular mill customers are beginning to court the distributors due to turn downs at the mills. On the **West Coast**, business is holding steady contrary to the usual seasonal trend and galvanized and coated-sheets seem to be running short.

PRICES—Prices of the following iron and steel products in **Great Britain** have been revised by the Iron & Steel Board as of Dec. 6. All changes quoted are based on long tons (2240 lb): Basic pig iron up 70¢ per ton. Foundry iron up $1.75 per ton. Re-rolling billets down $1.05 per ton. Forging billets down 35¢ per ton. Wire rods down 70¢ per ton. Boiler plates up $3.15 per ton. Rails up $1.40 per ton. Re-rolled bars down $1.05 per ton. Hand-milled sheets up $4.55 per ton.

Purchasing Agent's Checklist

VACUUM MELTING: Present capacity triple last year . . . . . p. 93

SCRAP: Re-lit furnaces dampen bullish market . . . . . p. 101

PRESSES: Buying increases as producers boost output . . . . p. 105

ASIA: Congress will seek greater U. S. private investment . . . p. 125

Comparison of Prices

(Effective Dec. 7, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 7 1954	Nov. 30 1954	Nov. 9 1954	Dec. 8 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.82	5.613
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	76.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.798¢	4.632¢

	Dec. 7 1954	Nov. 30 1954	Nov. 9 1954	Dec. 8 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$32.50	$32.50	$35.50	$33.50
No. 1 steel, Phila. area	*31.50*	32.00	33.00	30.50
No. 1 steel, Chicago	32.50	32.50	33.50	32.00
No. 1 bundles, Detroit	*26.50*	27.50	26.50	27.50
Low phos., Youngstown	35.50	34.50	35.50	35.50
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	44.50
No. 1 mach'y cast, Philadel'a	42.00	42.00	42.50	42.00
No. 1 mach'y cast, Chicago	43.00	41.50	42.50	37.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$32.17*	$32.33	$34.00	$32.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.75‡
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	89.875†	89.875*	90.625	85.75
Zinc, East St. Louis	11.50	11.50	11.50	10.00
Lead, St. Louis	14.80	14.80	14.80	13.30
Aluminum, virgin ingot	22.20	22.20	22.20	21.50
Nickel, electrolytic	67.67	67.67	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 215→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I11*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Menessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1*, *G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75–63.00	50.50–50.75	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland Massillon, *R3;* Coatesville, Pa., *C15.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11*

Most Areas Stay Firm, Quiet

Market slackens in several districts . . . Most prices unchanged . . . But Detroit openhearth grades off $1 . . . Rail embargo weakens Philadelphia . . . West Coast buying stronger.

◆ SCRAP market activity was generally light in most consuming areas this week. Prices were steady, with few changes reported. Detroit openhearth grades, however, which had held up better than most recently, slipped down $1.

A railroad embargo of the Philadelphia docks has weakened the scrap market there by slowing exports. Reflecting this, THE IRON AGE Heavy Melting Steel Scrap Composite Price edged down 16¢ to $32.17 per gross ton. The trade, however, expects the embargo to be lifted shortly.

Pick-ups in buying were especially noted in St. Louis, Birmingham and on the West Coast. Dealers and brokers in all areas generally look for a stronger market after the first of the year. And some mill sources are agreeing that continued higher ingot rates will very likely mean a tighter scrap market early in '55.

Buffalo dealers are resisting attempts by U. S. mills to buy blast furnace material at lower prices. Canadian buying of cast has resumed.

Pittsburgh . . . Scrap prices held firm but unchanged this week. Only activity was a purchase by an independent mill on the perimeter of the district at prices roughly equivalent to those paid earlier by consumers closer to dealers' yards. Other mills in the area remained out of the market. If the steel operating rate maintains its present pace, a stronger price structure is looked for early next year.

Chicago . . . Bolstered by increased mill interest if not sales, Chicago's scrap market seemed to be tightening slightly with even a mild upturn in turnings buying at the broker level despite an extremely poor market in that grade over past weeks. Reports of speculative buying in other grades are increasing. Electric furnace was still slipping slightly but the market indicated no strong tendency either up or down on the basis of sales at press time. Inquiries by several mills, as well as increased shipments on old orders, had the effect of bolstering the market early last week. Most suppliers are feeling better about the immediate outlook. Sales of forge crop, angle and splice bar and machinery cast at better prices indicate the scattered nature of any advances in prices.

Philadelphia . . . Tone of the market is fair to weak with a railroad embargo of the docks temporarily slowing the export picture. This was slapped on last Friday and is expected by at least one major exporter to be lifted perhaps by this Friday. Meanwhile, local mills were buying in dribs and drabs only. Rest of the month will probably be slow with a pickup expected in January. Openhearth prices edged down this week.

New York . . . This market continues quiet but steady. While domestic mill buying is a little disappointing to the trade, exports are bolstering the market. Prices are unchanged with the exception of clean cast chemical borings which rose $2 on the basis of a sale to the leading local consumer.

Detroit . . . No. 1 steelmaking grades sustained a $1 loss this week as orders generally reflected a similar slump in December automotive lists. Turnings remained the same although some weakness was observed in machine shop turnings. No. 2 bundles and heavy melting also held to quoted price levels, but this in itself represented a drop of the price offered by the area's major consumer. Low phos remained strong with some foundries paying premium prices for high quality.

Cleveland . . . Both Cleveland and Valley markets remained firm but quiet last week with no major price changes. Most dealers still shipping on orders received in November. A foundry purchase of heavy plate and structural scrap for auto engines and a mill purchase of blast furnace scrap, both at prevailing prices, were the only significant new buys.

Birmingham . . . Major open hearth consumers in the district came back into the market this week for limited tonnages at previously established prices. Mills are reported again reluctant to buy No. 2 bundles. Cast is easier, with some foundries reducing inventories for the end of the year and others holding up shipments on present orders until after Jan. 1.

St. Louis . . . Steel mills in the St. Louis industrial district are in comfortable inventory position and will continue to buy scrap at prevailing prices. Buying is expected to be at steady rates for the remainder of the year. There is no tendency for a speculative market. Prices are unchanged.

Cincinnati . . . Most grades dropped from $1 to $2 last week on basis of routine purchase by one area producer. Tonnage was almost identical to November buys. No. 2 grades of steel scrap were especially weak.

Buffalo . . . Renewed buying of cast by Canadian consumers featured the scrap market this week. Much of this buying is in truckload lots. Steel grades are steady with dealers shipping on recent orders. Efforts to lower blast furnace grades were unsuccessful as dealers refused to recognize mills' bids.

Boston . . . Scrap market in New England is wavering with light demand for some items, none for some others. Prices are unchanged but the outlook is uncertain.

West Coast . . . Seattle and San Francisco markets continue stable, with only significant development a firming of San Francisco cupola cast at $43. But in Los Angeles the situation is more fluid. Mills insist they are paying only quoted prices, but brokers are reported paying dealers $2 to $3 higher on some orders. A few sales were reported at even higher prices, but the tonnages so far have not been representative. Three shiploads of scrap are slated to leave Los Angeles this month for Europe and the Orient.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Berman

Scrap Prices *(Effective Dec. 7, 1954)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and ms. turns.	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	37.00 to 38.00
Heavy turnings	29.00 to 30.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	46.00 to 47.00
RR. steel wheels	38.00 to 39.00
RR. spring steel	38.00 to 39.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00

Chicago

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 factory bundles	34.00 to 35.00
No. 1 dealers' bundles	32.00 to 33.00
No. 2 dealers' bundles	23.00 to 24.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	38.00 to 40.00
Low phos. punch'gs, plate	35.00 to 37.00
Low phos. 3 ft and under	34.00 to 35.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	53.00 to 54.00
Rails 2 ft and under	50.00 to 51.00
Locomotive tires, cut	36.00 to 37.00
Cut bolsters & side frames	37.00 to 38.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	43.00 to 44.00
RR. couplers and knuckles	37.00 to 38.00
No. 1 machinery cast.	42.00 to 44.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast	30.00 to 31.00
Cast iron brake shoes	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Malleable	43.00 to 44.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	$30.50 to $32.50
No. 2 hvy. melting	28.50 to 30.00
No. 1 bundles	30.50 to 32.50
No. 2 bundles	25.50 to 27.00
Machine shop turn.	17.00 to 18.00
Mixed bor. short turn.	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	20.50 to 21.50
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	33.50 to 34.00
Low phos. 2 ft and under	34.50 to 35.00
Low phos. punch'gs	34.50 to 35.00
Elec. furnace bundles	32.50 to 33.00
Heavy turnings	29.00 to 30.00
RR. steel wheels	34.50 to 35.00
RR. spring steel	34.50 to 35.00
Rails 18 in. and under	45.00 to 46.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.00
Cast iron car wheels	41.00 to 42.00
Malleable	39.00 to 40.00
Unstripped motor blocks	.... 27.00
No. 1 machinery cast.	41.00 to 43.00
Charging box cast.	35.00 to 36.00

Cleveland

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	33.00 to 34.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut struct'r'l & plates, 2 ft & under	36.00 to 38.00
Drop forge flashings	31.00 to 33.00
Low phos. 2 ft & under	33.00 to 34.00
No. 1 RR. heavy melting	34.00 to 35.00
Rails 3 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	.... 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	38.00 to 39.00
Malleable	.... 44.00

Youngstown

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.50
Cast iron borings	22.00 to 23.50
Low phos. plate	35.00 to 36.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.50 to 26.50
No. 1 busheling	30.00 to 31.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. plate	33.00 to 34.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	37.00 to 38.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles, openhearth	26.00 to 27.00
No. 2 bundles	18.00 to 19.00
New busheling	25.00 to 26.00
Drop forge flashings	25.00 to 26.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. punch'gs, plate	28.00 to 29.00
No. 1 cupola cast.	.... 34.00
Heavy breakable cast.	.... 25.00
Stove plate	.... 30.00
Automotive cast.	.... 38.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	34.00 to 35.00
Rails, random lengths	40.00 to 41.00
Rails, 18 in. and under	46.50 to 47.50
Locomotive tires, uncut	33.50 to 34.50
Angles and splice bars	34.50 to 35.50
Std. steel car axles	35.50 to 36.50
RR. spring steel	34.50 to 35.50
Cupola cast.	44.00 to 45.00
Hvy. breakable cast.	35.00 to 36.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	36.00 to 37.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	34.00 to 35.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	23.00 to 24.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	9.00 to 10.00
Mired bor. and turn.	10.00 to 11.00
Shoveling turnings	12.50 to 13.50
Clean cast chem. borings	20.00 to 21.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles	22.00 to 23.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	29.00 to 30.00
Bar crops and plate	33.00 to 34.00
Structural and plate, 2 ft	33.00 to 34.00
No. 1 RR. hvy. melting	31.50 to 32.50
Scrap rails, random lgth.	36.00 to 37.00
Rails, 18 in. and under	40.00 to 41.00
Angles & splice bars	38.00 to 39.00
Rerolling rails	41.00 to 42.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.00 to 36.00
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles	22.00 to 23.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	22.00 to 23.00
Elec. furnace, 3 ft & under	24.00 to 25.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and short turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	15.00 to 16.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos., 18 in. & under	35.00 to 36.00
Rails, random lengths	38.00 to 39.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	.... $24.00
No. 2 hvy. melting	.... 20.00
No. 1 bundles	.... 23.00
No. 2 bundles	.... 18.00
No. 3 bundles	.... 14.00
Machine shop turn.	.... 6.00
Cast iron borings	.... 9.00
No. 1 RR. hvy. melting	.... 24.00
No. 1 cupola cast.	.... 43.00

Los Angeles

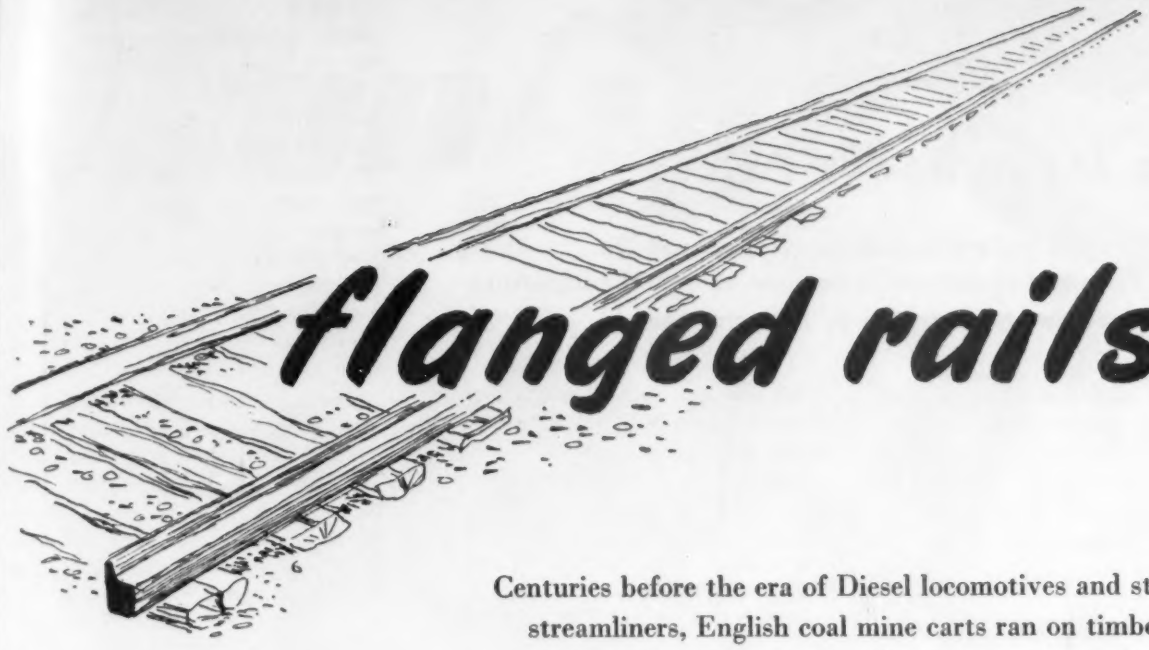
No. 1 hvy. melting	.... $22.00
No. 2 hvy. melting	.... 20.00
No. 1 bundles	.... 21.00
No. 2 bundles	.... 18.00
No. 3 bundles	.... 14.00
Machine shop turn.	.... 6.00
Shoveling turnings	.... 9.00
Cast iron borings	.... 9.00
Elec. furn. 1 ft and under	.... 27.00
No. 1 RR. hvy. melting	.... 23.00
No. 1 cupola cast.	.... 43.00

Seattle

No. 1 hvy. melting	.... $27.00
No. 2 hvy. melting	.... 23.00
No. 1 bundles	.... 20.00
No. 2 bundles	.... 17.00
No. 3 bundles	.... 13.00
No. 1 cupola cast.	.... 35.00
Mixed yard cast.	.... 35.00

Hamilton, Ont.

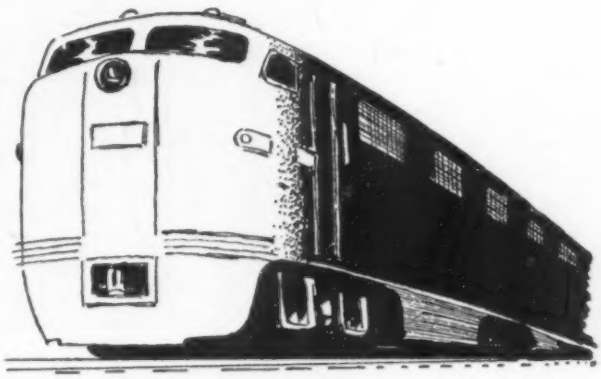
No. 1 hvy. melting	.... $26.00
No. 2 hvy. melting	.... 23.00
No. 1 bundles	.... 26.00
No. 2 bundles	.... 23.00
Mixed steel scrap	.... 20.00
Bushelings	.... 21.00
Bush., new fact prep'd	.... 24.00
Bush., new fact unprep'd	.... 20.00
Short steel turnings	.... 12.00
Mixed bor. and turn.	.... 12.00
Rails, rerolling	.... 35.00
Cast scrap	$42.00 to 45.00



flanged rails

Centuries before the era of Diesel locomotives and steel streamliners, English coal mine carts ran on timbers. In 1776, "improved" rails of cast iron were produced in Coalbrookdale, England, with an inside flange some 3 inches above the path of the wagon wheel. These rails, laid on cross sleepers or longitudinal sills, proved unsatisfactory, however, because dirt collected on the surface and caused hard traction.

Now, thousands of miles of steel rails crossing and criss-crossing the continent assure fast, smooth transportation. To maintain the vast facilities and equipment of the nation's railroads, and for thousands of other civilian and military requirements, an unfailing supply of steel is vital. And scrap is demanded in tens of thousands of carloads.



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Brass Mills Boost Prices

Cite higher labor, materials costs . . . Hike about ½¢ per lb . . . Free-cutting rod cut 1¢ because of import competition . . . Renew lead-zinc tariff drive—*By R. L. Hatschek.*

◆ PRICES take the headlines this week with a general brass mill increase and a reduction in titanium sponge. Outstanding feature of the new brass mill lists is the reduction in free-cutting brass—an item feeling considerable competition from imports.

On the subject of imports, National Lead and Zinc Committee is renewing its drive for either higher tariffs or some sort of restriction in imports. Committee chairman Otto Herres last week stated that the government's supplementary stockpiling has not accomplished its original aim of supporting prices high enough to maintain an adequate mobilization base.

He cited average monthly zinc imports of 50,000 tons, domestic mine output of 40,000 tons and consumption of 76,000 tons during the first 8 months of 1954.

Almost coinciding with this was a report of the President's special cabinet committee on a national minerals policy. Report urged periodic restudy of supply-demand position and maintenance of a production base sufficient to meet national emergency. Review of long-term stockpile goals was also called for. Committee stressed the need for closer cooperation between government and the mineral industry as well as the necessity for new laws to foster discovery and development of new sources.

BRASS . . . Following the lead of Chase Brass & Copper Co., all major brass mills revised prices last week. Increase in base prices was about ½¢ per lb depending on alloy, with the significant exception of free-cutting brass rod, which was cut 1¢ per lb. Effective dates were Dec. 1 and 2 for different companies. The new prices are quoted on p. 211.

Basis for the new lists are copper at 30.00¢. High Grade zinc at 12.85¢, tin at 90.00¢, nickel at 65.38¢ and lead at 15.18¢.

Increased labor costs, as well as adjustments in metal costs, were cited as a contributing factor. The decline in free-cutting rod, however, is significant in that foreign competition has been quite keen in this product. Mills also edged some of the scrap buying prices a bit higher.

COPPER . . . Government will continue to make its dwindling supply of emergency copper available to industry for the rest of the year—but on a strictly rationed basis. As of last week, Business & Defense Services Administration reported 7603 tons left to be distributed.

As a result, only firms which can make a "clear showing" that they face shutdown or large layoff will be eligible for the metal.

BDSA originally had over 40,000 tons of copper available, but, since copper production has resumed, most consumers are now getting copper from their normal sources, an official says. Since the strike hit at a time when copper demand was surging, the drain was particularly heavy.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Dec. 1	Dec. 2	Dec. 3	Dec. 4	Dec. 6	Dec. 7
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	90.25	90.25	90.00	....	89.875	89.875*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

LEAD . . . Prices on the London Metal Exchange have been slipping for the past few weeks and at the end of last week lead had declined to a New York equivalent, including duty and freight, of just under the 15¢ quoted here. The domestic market which had been rather weak despite the higher London price, has also perked up somewhat. It's felt, though, that the increase in demand apparent last week was more the result of earlier buying abstinence than any new factor.

The trade early this week was still waiting for General Services Administration to send out its orders for December stockpile metal. Delay seems to have irked some members of the trade, but it's believed to have been more of an administrative detail and of no special significance.

ZINC . . . Market for zinc continues to coast along at fairly good levels with demand coming from all major consuming industries, diecasters, galvanizers and brass mills. London zinc is also moving along without any significant change, pricewise about ½¢ below parity with New York.

As with lead (see above), zinc sellers were still waiting for GSA offers to buy for the stockpile early in the week.

TITANIUM . . . No immediate effect is expected in mill product prices as a result of the price cut effected by E. I. duPont de Nemours & Co. last week (see p. 103). Move brings grade A-1 sponge to $4.50 per lb and grade A-2 to $4.00.

ALUMINUM . . . Civilian users of aluminum will receive shipments totaling some 1.3 million tons in 1954, Business & Defense Services Administration estimates. This compares with estimated primary production of 1.46 million tons and is 50,000 tons more than in any previous year, despite the fact that several segments of aluminum consuming industry were operating below normal during much of the year.

Total military use, according to BDSA, will be about 150,000 tons, a drop of 200,000 tons from 1953.

High level of construction and growth of new uses for aluminum in construction, along with growth of aluminum packaging and continued heavy demands by appliance and motor vehicle manufacturers, were responsible for the increased civilian use, BDSA says.